INDEPENDENT ORBITER ASSESSMENT

ASSESSMENT
OF THE
CREW EQUIPMENT
SUBSYSTEM

12 FEBRUARY 1988

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MCDONNELL DOUGLAS ASTRONAUTICS COMPANY HOUSTON DIVISION

SPACE TRANSPORTATION SYSTEM ENGINEERING AND OPERATIONS SUPPORT

WORKING PAPER NO. 1.0-WP-VA88005-07

INDEPENDENT ORBITER ASSESSMENT ASSESSMENT OF THE CREW EQUIPMENT SUBSYSTEM

12 FEBRUARY 1988

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Independent Orbiter Assessment Assessment of the Crew Equipment FMEA/CIL

1.0 EXECUTIVE SUMMARY

The McDonnell Douglas Astronautics Company (MDAC) was selected in June 1986 to perform an Independent Orbiter Assessment (IOA) of the Failure Modes and Effects Analysis (FMEA) and Critical Items List (CIL). Direction was given by the STS Orbiter and GFE Projects Office to perform the hardware analysis using the instructions and ground rules defined in NSTS 22206, Instructions for Preparation of FMEA and CIL, 3 November 1987, Change No. 4.

The IOA effort first completed an analysis of the Crew Equipment hardware, generating draft failure modes and potential critical items. To preserve independence, this analysis was accomplished without reliance upon the results contained within the NASA FMEA/CIL documentation. The IOA results were then compared to the NASA FMEA/CIL baseline with proposed Post 51-L updates included. A resolution of each discrepancy from the comparison is provided through additional analysis as required. This report documents the results of that comparison for the Orbiter Crew Equipment hardware.

The analysis was performed on only a subset of the crew equipment. This subset was agreed upon during negotiation between MDAC and the STS Orbiter and GFE Projects Offices. The subset includes crew equipment which meets the following criteria: (1) normally manifested on every flight; (2) has received final design approval; and (3) is covered by a NASA FMEA/CIL.

The IOA product for the Crew Equipment analysis consisted of 352 failure mode "worksheets" that resulted in 78 potential critical items being identified. Comparison was made to the NASA baseline (as of 1 January 1988) which consisted of 351 FMEAs and 82 CIL items. The comparison determined if there were any results which had been found by the IOA but were not in the NASA baseline. Figure 1 presents a comparison of the proposed Post 51-L NASA baseline, with the IOA recommended baseline, and any issues.

The issues arose due to differences between the NASA and IOA FMEA/CIL preparation instructions. NASA had used an older ground rules document which has since been superseded by the NSTS 22206 used by the IOA. After comparison, there were no discrepancies found that were not already identified by NASA, and the remaining issues may be attributed to differences in ground rules.

CREW EQUIPMENT ASSESSMENT OVERVIEW

CREW EQUIPMENT ASSESSMENT SUMMARY

ORIGINAL ASSESSMENT*

FINAL RESOLUTION**

		5	80	82	2 4	80	82	82 4			
4 EQ(EVA EQUIPMENT								Ž	IVA T00LS	
0A 75	10A NASA ISSUES 75 66 23 1 1 0	SUES 23 0						FMEA	0 18 o	10A NASA ISSUES 18 19 0 0 0 0	ISSUES 0 0
EVA TI	EVA TETHERS				**************************************		<u>-</u>	FG	A do	FOOD ASSEMBLIES	IES
18 18	10A NASA ISSUES 34 33 4 18 20 2	SUES 4				-		FMEA CIL	10A 146 0	10A NASA ISSUES 146 110 53 0 0 0	ISSUES 53 0
EVA)	EVA TOOLS		ı					ORI	BITER	ORBITER HARDWARE	ARE
99 59	NASA ISSUES 88 14 59 2	SUES 14 2						FMEA	10A 50	NASA 35 2	NASA ISSUES 35 29 2 0

FINAL NASA BASELINE AS OF 1 JANUARY 1988

NASA PROPOSED BASELINE

Figure 1 - CREW EQUIPMENT FMEA/CIL ASSESSMENT

2

2.0 INTRODUCTION

2.1 Purpose

The 51-L Challenger accident prompted the NASA to readdress safety policies, concepts, and rationale being used in the National Space Transportation System (NSTS). The NSTS Office has undertaken the task of re-evaluating the FMEA/CIL for the Space Shuttle design. The MDAC is providing an independent assessment of the proposed Post 51-L Orbiter FMEA/CIL for completeness and technical accuracy.

2.2 Scope

The scope of the independent FMEA/CIL assessment activity encompasses those Shuttle Orbiter subsystems and GFE hardware identified in the Space Shuttle Independent FMEA/CIL Assessment Contractor Statement of Work. Each subsystem analysis addresses hardware, functions, internal and external interfaces, and operational requirements for all mission phases.

2.3 Analysis Approach

The independent analysis approach is a top-down analysis utilizing as-built drawings to breakdown the respective subsystem into components and low-level hardware items. Each hardware item is evaluated for failure mode, effects, and criticality. These data are documented in the respective subsystem analysis report, and are used to assess the proposed Post 51-L NASA and Prime Contractor FMEA/CIL. The IOA analysis approach is summarized in the following Steps 1.0 through 3.0. Step 4.0 summarizes the assessment of the NASA and Prime Contractor FMEA/CIL which is documented in this report.

- Step 1.0 Subsystem Familiarization
 - 1.1 Define subsystem functions
 - 1.2 Define subsystem components
 - 1.3 Define subsystem specific groundrules and assumptions
- Step 2.0 Define subsystem analysis diagram
 - 2.1 Define subsystem
 - 2.2 Define major assemblies
 - 2.3 Develop detailed subsystem representations
- Step 3.0 Failure events definition
 - 3.1 Construct matrix of failure modes
 - 3.2 Document IOA analysis results

Step 4.0 Compare IOA analysis data to NASA FMEA/CIL

- 4.1 Resolve differences4.2 Review in-house
- 4.3 Document assessment issues
- 4.4 Forward findings to Project Manager

2.4 Groundrules and Assumptions

The groundrules and assumptions used in the IOA are defined in Appendix B. The subsystem specific groundrules were defined to provide necessary additions and clarifications to the ground rules and assumptions contained in NSTS 22206.

3.0 SUBSYSTEM DESCRIPTION

3.1 Design and Function

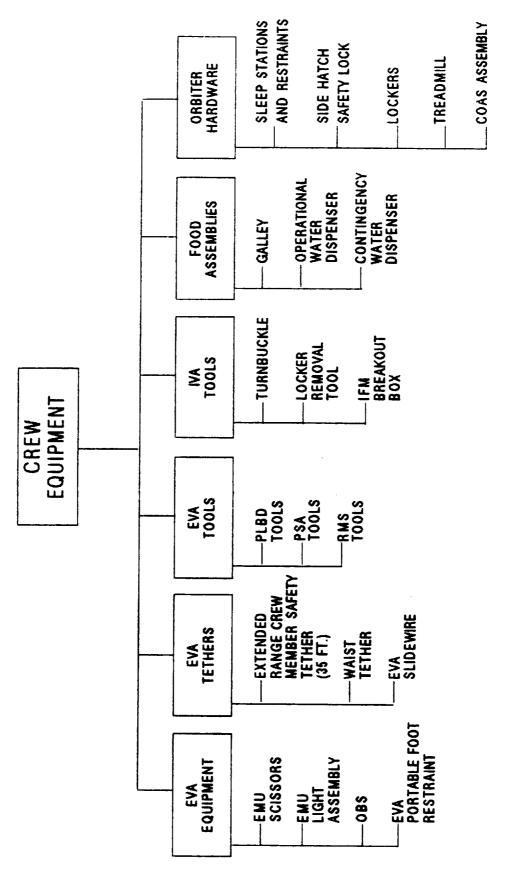
The Crew Equipment consists of that hardware required for support of crew activities during flight. It includes both IVA and EVA support equipment.

3.2 Interfaces and Locations

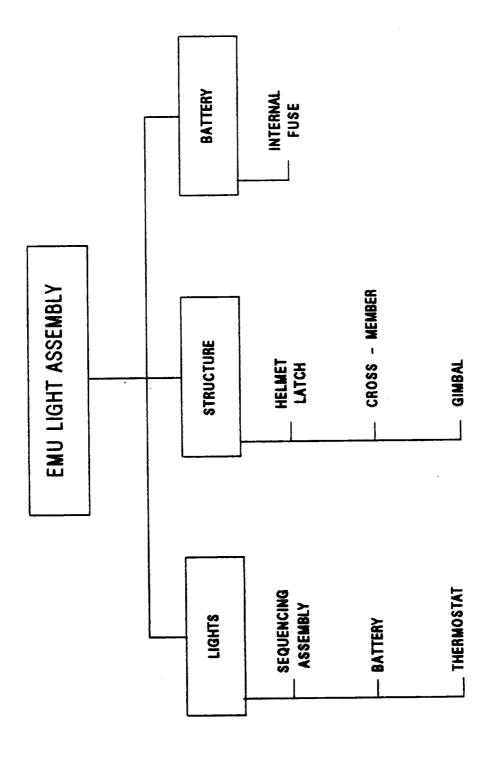
The crew equipment items are located in both the crew compartment and the payload bay.

3.3 Hierarchy

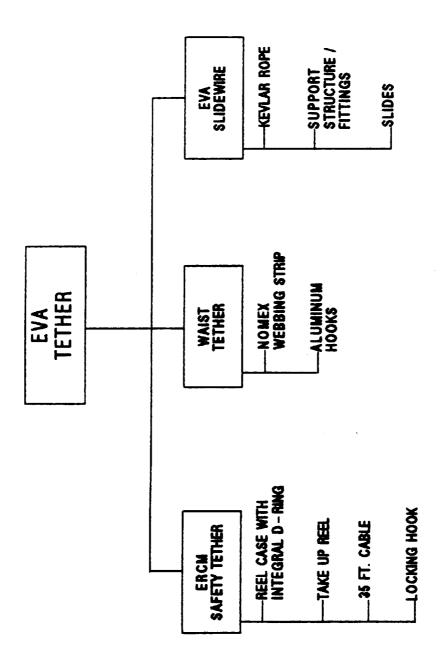
The overall hierarchy for crew equipment is shown in Figure 2. Detailed breakdown are presented in Figures 3 through 12.



Crew Equipment Hierarchy 6 Figure 29:



EMU Light Assembly Hierarchy 7 Figure 30:



EVA Tether Hierarchy 8 Figure 31:

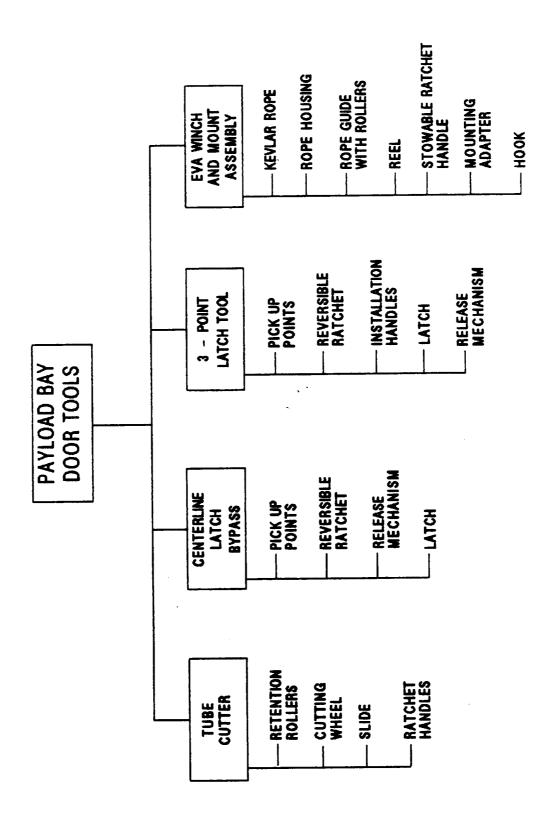


Figure 32: Payload Bay Door Tools Hierarchy

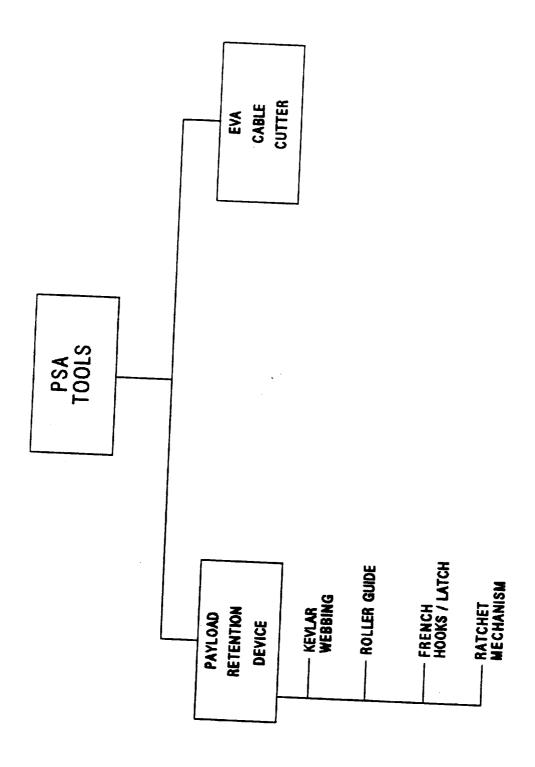
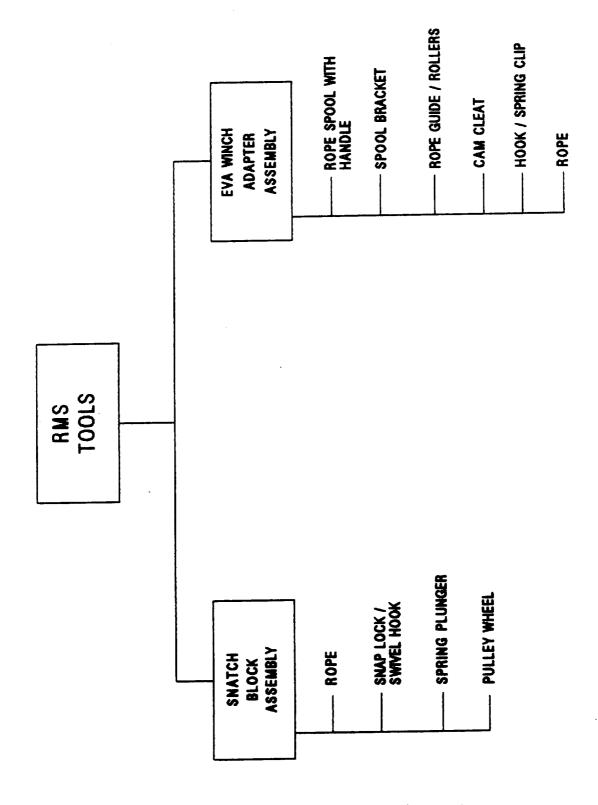


Figure 33: PSA Tool Hierarchy



RMS Tool Hierarchy Figure 34:

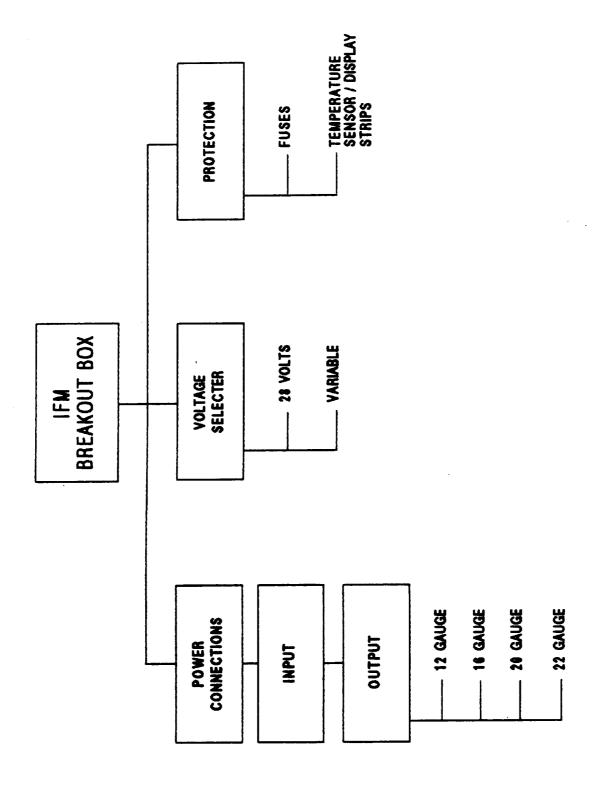
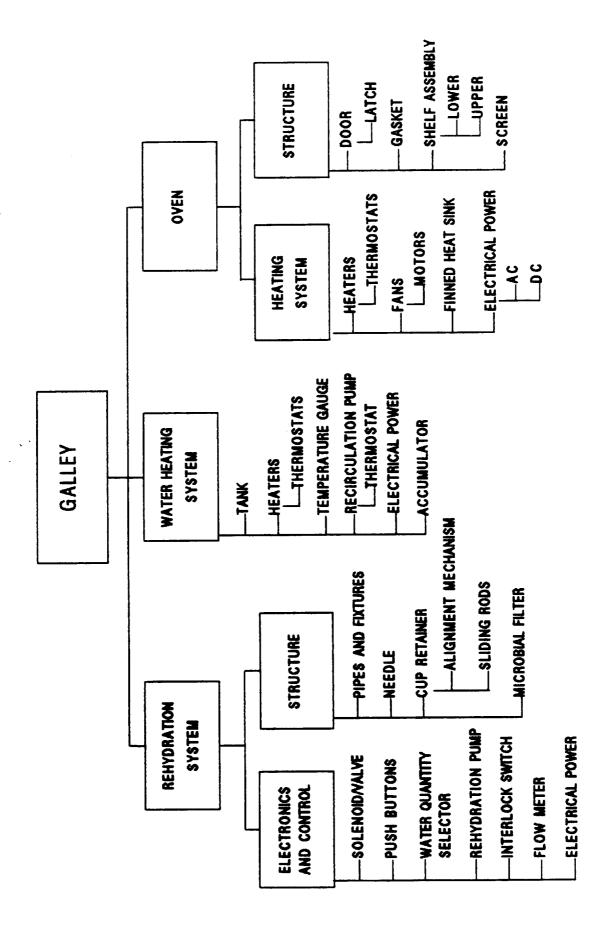
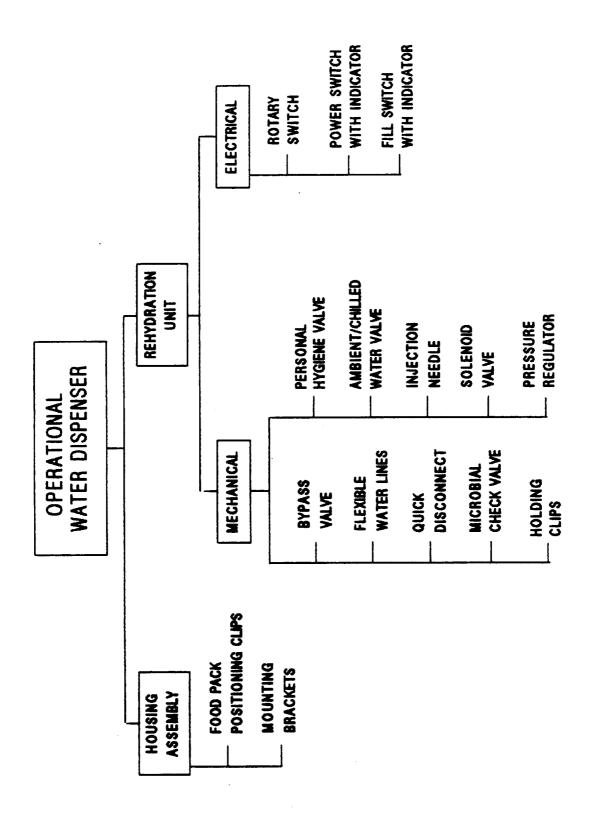


Figure 35: IFM Breakout Box Hierarchy



Galley Hierarchy Figure 36:



OWDA Hierarchy
14 Figure 37:

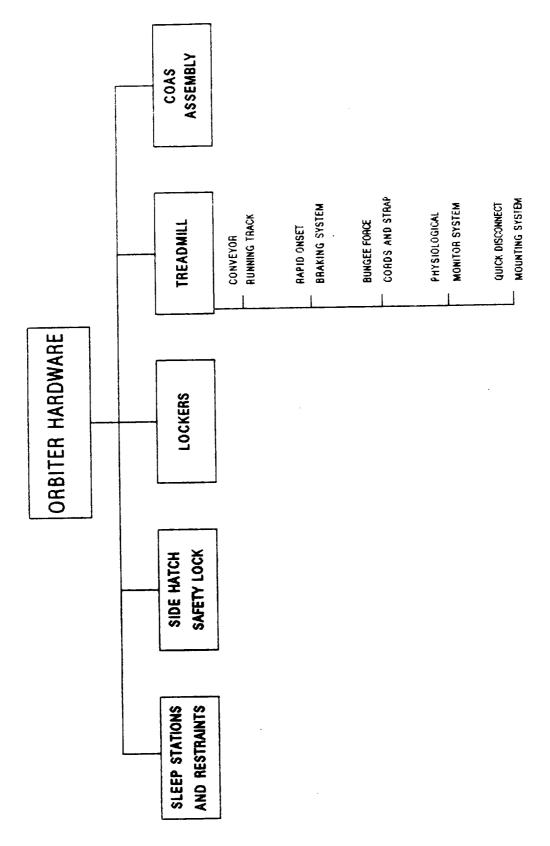
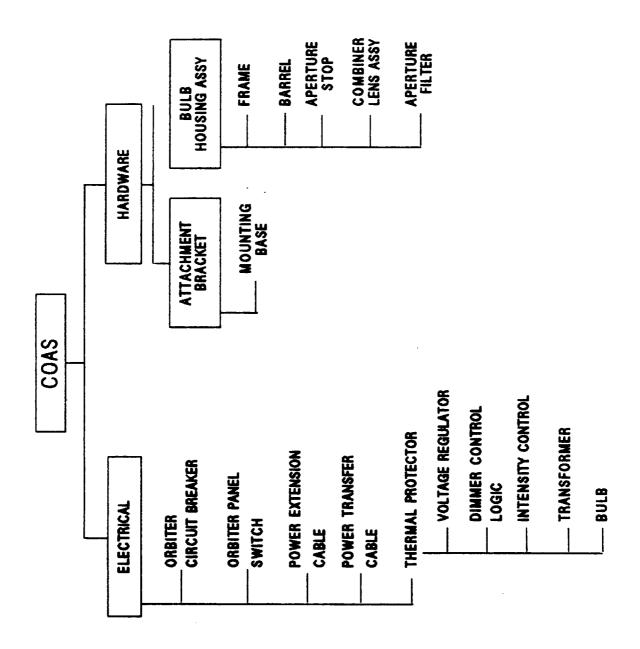


Figure 38: Orbiter Hardware Hierarchy



COAS Hierarchy Figure 39:

4.0 ASSESSMENT RESULTS

The IOA analysis of the Crew Equipment hardware initially generated 352 failure mode worksheets and identified 78 Potential Critical Items (PCIs) before starting the assessment process. In order to facilitate comparison, 78 additional failure mode analysis worksheets were generated. These analysis results were compared to the proposed NASA Post 51-L baseline of 351 FMEAs and 82 CIL items. The FMEAs that remained had minor discrepancies that did not affect criticality.

A summary of the quantity of NASA FMEAs assessed, versus the recommended IOA baseline, and any issues identified is presented in Table I.

Table I SU	MARY OF IO	A FMEA ASSI	ESSMENT
Component	NASA	IOA	Issues
EVA Equipment EVA Tethers EVA Tools IVA Tools Food Assemblies Orbiter Hardware	66 33 88 19 110 35	75 34 99 18 146 50	23 4 14 - 53 29
TOTAL	351	422	123

A summary of the quantity of NASA CIL items assessed, versus the recommended IOA baseline, and any issues identified is presented in Table II.

Table II S	SUMMARY OF	IOA CIL ASS	SESSMENT
Component	NASA	IOA	Issues
EVA Equipment EVA Tethers EVA Tools IVA Tools Food Assemblies Orbiter Hardware	1 20 59 - - 2	1 18 59 - - 2	- 2 2 - -
TOTAL	82	80	4

Appendix C presents the detailed assessment worksheets for each failure mode identified and assessed. Appendix D highlights the NASA Critical Items and corresponding IOA worksheet ID. Appendix E contains IOA analysis worksheets supplementing previous analysis results reported in Space Transportation System Engineering and Operations Support (STSEOS) Working Paper No. 1.0-WP-VA87001-01, Analysis of the Crew Equipment Subsystem, 02 November 1987. Appendix F provides a cross reference between the NASA FMEA and corresponding IOA worksheet(s). IOA recommendations are also summarized.

Table III presents a summary of the IOA recommended failure criticalities for the Post 51-L FMEA baseline. Further discussion of each of these subdivisions and the applicable failure modes is provided in subsequent paragraphs.

TABLE III SUMM	ARY OF	IOA RE	COMMEN	DED FAI	LURE CR	ITICAL	ITIES
Criticality:	1/1	2/1R	2/2	3/1R	3/2R	3/3	TOTAL
EVA Equipment EVA Tethers EVA Tools IVA Tools Food Assemblies Orbiter Hardware	1 15 23 - -	- 3 34 - - 2	- - - -	- 6 8 - 6	49 1 3 - 45 -	25 15 33 10 101 42	75 34 99 18 146 50
TOTAL	39	39	<u>-</u>	20	98	226	422

Of the failure modes analyzed, 80 were determined to be critical items. A summary of the IOA recommended critical items is presented in Table IV.

Table IV SUMMARY OF IOA RECOMMENDED FAILURE CRITICALITIES							
Criticality:	1/1	2/1R	2/2	3/1R	3/2R	3/3	TOTAL
EVA Equipment EVA Tethers EVA Tools IVA Tools Food Assemblies Orbiter Hardware	1 15 23 - -	- 3 34 - - 2	-	- 2 - -	- - - -	- - - -	1 18 59 - - 2
TOTAL	39	39		2	-	- 	80

The scheme for assigning IOA assessment (Appendix C) and analysis (Appendix E) worksheet numbers is shown in Table V.

Table	V IOA WORKSHEET N	JMBERS
Component	IOA ID Number	FMEAS ADDED TO ORIGINAL ANALYSIS
EVA Equipment EVA Tethers EVA Tools IVA Tools Food Assemblies Orbiter Hardware	CRWEQP 1100-1499 CRWEQP 2100-2399 CRWEQP 3100-3899 CRWEQP 4100-4399 CRWEQP 5100-5499 CRWEQP 6100-6599	11100-11499 12100-12399 13100-13899 14100-14399 15100-15499 16100-16599

4.1 EVA Equipment Assessment Results

The IOA analysis identified five failure modes of the EVA scissors. The NASA determined the EVA scissors were non-critical items, so there were no FMEA/CILs available for comparison. The assessment of the EMU light assembly generated eight new failure modes. One of these failure modes (MDAC ID 11216) shows the battery cell as a criticality 1/1 because of the possibility of toxic venting or explosion. Three new FMEAs were generated for the OBS. The IOA analysis of the OBS identified five failure modes which were not considered by NASA. The failure modes were not critical, but were included for completeness. The assessment of the PFR generated one new FMEA, which was not critical.

4.2 EVA Tethers Assessment Results

The IOA disagrees with NASA's analysis of a hook failing to close as criticality 1/1. The failure mode implies that the hook is not in use, so its failure will not lead to an unrestrained crewmember. The IOA differs with NASA on this issue for both the ERCM safety tether and the waist tether. For all other failure modes, MDAC either agrees with, or accepts NASA's analysis.

4.3 EVA Tools Assessment Results

The NASA analysis does not include a failure mode corresponding to a failure of the three-point latch hook. This failure mode should be added to the NASA's FMEA/CIL data base. The IOA believes that NASA's analysis of the snatch block hook latch as a criticality 2/1R is too high and should be lowered. If the hook latch fails to close, then the tool is not in use at that time. For the other EVA tools, the IOA either agrees with or accepts NASA's results.

4.4 IVA Tools Assessment Results

The FMEA/CIL assessment recommends deleting three FMEAs as being non-credible failures (MDAC IDs 4200, 4307, 4310). With these deletions, IOA agrees completely with NASA on the IVA tools that were analyzed. All of the tools were found to be non-critical primarily because of redundant hardware.

4.5 Food Assemblies Assessment Results

The IOA found that none of the hardware which had been analyzed were critical hardware. IOA identified 35 FMEAs which were not analyzed by NASA, and generated 44 new FMEAs to correspond to failure modes NASA identified which had not been analyzed by IOA. The slight differences in criticality ratings of FMEAs between IOA and NASA is primarily due to differences in groundrules. During the assessment process it was determined that five IOA failure modes were non-credible and IOA recommends that these be deleted.

4.6 Orbiter Hardware Assessment Results

The IOA found that none of the orbiter hardware, which had been analyzed, were critical hardware. The assessment did generate two new FMEAs for the treadmill and six new FMEAs for the COAS. The assessment recommends accepting NASA's FMEAs and criticalities for the mid-deck stowage lockers.

5.0 REFERENCES

Reference documentation available from NASA and Rockwell was used in the analysis. The documentation used included the following:

- NSTS 22206 Instructions for preparation of Failure Modes and Effects Analysis (FMEA) and Critical Items List (CIL), Change No. 4, 11-3-87.
- 2. V602-660302 EO A-09, Turnbuckle, 4-23-85.
- 3. V625-650899 EO A-02, Locker Removal Tool, 1-25-79.
- 4. 10131-10031, Treadmill Exerciser Assembly, 9-25-84.
- 5. V620-660810 EO D-05, Crewman Optical Alignment Sight Assembly, 1-31-86.
- 6. V620-660730 EO A-09, COAS Aft Bracket, 11-21-85.
- 7. V620-660720 EO B-02, COAS Forward Bracket, 7-26-85.
- 8. SED 48101600 Rev A, Operational Water Dispenser Assembly, 2-10-83.
- 9. V602-660604 EO B-17, Locker Assembly, 11-8-84.
- 10. SED 48101607 Rev A, Contingency Water Dispenser Assembly, 8-18-82.
- 11. SED 33102357 Rev A DCN 8-5-82, Snatch Block Assembly, 8-5-82.
- 12. 10159-20076, EVA Scissors Assembly, 5-9-83.
- 13. SED 33102348 Rev A, EVA Winch Adapter, 12-1-81.
- 14. SED 33101368 DCN 3/28/83, EVA Tube Cutter Assembly, 3-28-83.
- 15. SED33101621 DCN 1/25/83, Centerline Latch Tool Assembly, 1-25-83.
- 16. SED 33101327 Rev C, Three Point Latch Tool Assembly, 5-5-84.
- 17. SED 33101570, EVA Winch and Mount Assembly, 2-16-80.
- 18. 10163-10063, Payload Retention Device, 1-12-82.
- 19. 10134-20001, In-Flight Maintenance Breakout Box, 4-2-85.
- 20. V617-544702, EVA Operational Slidewire System Link 7-8-82.
- 21. M072-544700, EVA Operational Slidewire System Technical Order Installation Drawing, 9-23-82.

- 22. V617-544701, EVA Operational Slidewire System Yoke, 7-7-82.
- 23. V617-544720, EO B-01 EVA Operational Slidewire, 7-22-85
- 24. 10161-10061, EMU Lights Assembly, 5-2-81.
- 25. 10161-60029, EMU Light Sequencer Mark IV Schematic, 11-29-83.
- 26. 10161-20033, Gimbal Assembly: EMU Lights Assembly, 4-29-81.
- 27. 10161-20001, Single Cell Battery Module: EMU Light Assembly, 4-18-81.
- 28. SED 42100961, Operational Bioinstrumentation System EVA Cable Assembly, 10-10-84.
- 29. 10162-10062 EO 101-374, Extended Range Crew Member Safety Tether Assembly, 8-30-85.
- 30. 10151-20040, Waist Tether Assembly, 1-23-80.
- 31. 10159-10034, Portable Foot Restraint Platform Assembly, 1-25-85.
- 32. 10155-20003, Portable Foot Restraint Boom Assembly, 11-1-82.
- 33. 10155-20004, Portable Foot Restraint Centerline Clamp Assembly, 3-7-85.
- 34. 10155-10035, Portable Foot Restraint Articulating Socket Assembly, 5-7-82.
- 35. V601-669100 Rev B, Sleep Station Restraint Assembly, 2-14-84.
- 36. JSC 20466, EVA Catalog Tools and Equipment, 11-4-85.
- 37. JSC 12770, Shuttle Flight Operations Manual Vol. 12, Crew Systems, Basic Rev A, 8-16-85.
- 38. SSSH 9.5, Crew Optical Alignment Sight Assembly, 10-18-83.
- 39. JSC-20365, Food System and Dining Workbook.
- 40. JSC-17321, FDF: IFM Checklist.
- 41. EVA Prep/Post 2102 Training Workbook.
- 42. JSC-12770, Shuttle Flight Operations Manual Vol. 15, EVA Systems, Basic Rev. A, 1-6-84
- 43. SED 33103383 Rev A, Side Hatch Safety Lock, 5-15-85.

APPENDIX A ACRONYMS

AOA - Abort-Once-Around ASE - Aerospace Support Equipment - Abort-To-Orbit ATO C&W - Caution and Warning - Critical Items List CIL COAS - Crew Optical Alignment Sight - Contingency Water Dispenser Assembly CWDA - Direct Current dc EMU - Extravehicular Mobility Unit ERCM - Extended Range Crew Member - Extravehicular Activity EVA - Fahrenheit F - Functional F - Failure Modes and Effects Analysis - Flight Systems Software Requirements FSSR - Government Furnished Equipment GFE GPC - General Purpose Computer - Hardware HW IFM - In-Flight Maintenance IMU - Inertial Measurement Unit - Independent Orbiter Assessment IOA IUS - Inertial Upper Stage - Intravehicular Activity IVA JSC - Johnson Space Center - Light Emitting Diode LED MDAC - McDonnell Douglas Astronautics Company - Not Applicable NSTS - National Space Transportation System - Operational Bioinstrumentation System OBS - Operational Water Dispenser Assembly OWDA - Potential Critical Item PCI PFR - Portable Foot Restraint PHS - Personal Hygene Station - Payload Bay Door PLBD - Program Requirements Control Board Directive PRCBD - Payload Retention Device PRD PSA - Provision Stowage Assembly - Pounds per Square Inch psi - Quick Disconnect QD Rehydration StationRemote Manipulator System RHS RMS RTLS - Return-to-Launch Site

SFOM	- Shuttle Flight Operations Manual
SM	- Systems Management
SOP	- Secondary Oxygen Pack
SSSH	- Space Shuttle Systems Handbook
STS	- Space Transportation System
TAL	- Transatlantic Abort Landing
V	- Volt

APPENDIX B

DEFINITIONS, GROUND RULES, AND ASSUMPTIONS

- B.1 Definitions
 B.2 Project Level Ground Rules and Assumptions
 B.3 Subsystem-Specific Ground Rules and Assumptions

B.1 Definitions

Definitions contained in <u>NSTS 22206</u>, <u>Instructions For Preparation of FMEA/CIL</u>, 10 October 1986, change 4, 3 November 1987, were used with the following amplifications and additions.

INTACT ABORT DEFINITIONS:

RTLS - begins at transition to OPS 6 and ends at transition
to OPS 9, post-flight

TAL - begins at declaration of the abort and ends at transition to OPS 9, post-flight

AOA - begins at declaration of the abort and ends at transition to OPS 9, post-flight

<u>ATO</u> - begins at declaration of the abort and ends at transition to OPS 9, post-flight

<u>CREDIBLE (CAUSE)</u> - an event that can be predicted or expected in anticipated operational environmental conditions. Excludes an event where multiple failures must first occur to result in environmental extremes

<u>CONTINGENCY CREW PROCEDURES</u> - procedures that are utilized beyond the standard malfunction procedures, pocket checklists, and cue cards

<u>EARLY MISSION TERMINATION</u> - termination of onorbit phase prior to planned end of mission

EFFECTS/RATIONALE - description of the case which generated the
highest criticality

HIGHEST CRITICALITY - the highest functional criticality determined in the phase-by-phase analysis

<u>MAJOR MODE (MM)</u> - major sub-mode of software operational sequence (OPS)

MC - Memory Configuration of Primary Avionics Software System
(PASS)

MISSION - assigned performance of a specific Orbiter flight with payload/objective accomplishments including orbit phasing and altitude (excludes secondary payloads such as GAS cans, middeck P/L, etc.)

<u>MULTIPLE ORDER FAILURE</u> - describes the failure due to a single cause or event of all units which perform a necessary (critical) function

<u>OFF-NOMINAL CREW PROCEDURES</u> - procedures that are utilized beyond the standard malfunction procedures, pocket checklists, and cue cards

OPS - software operational sequence

<u>PRIMARY MISSION OBJECTIVES</u> - worst case primary mission objectives are equal to mission objectives

PHASE DEFINITIONS:

PRELAUNCH PHASE - begins at launch count-down Orbiter
power-up and ends at moding to OPS Major Mode 102 (liftoff)

<u>LIFTOFF MISSION PHASE</u> - begins at SRB ignition (MM 102) and ends at transition out of OPS 1 (Synonymous with ASCENT)

ONORBIT PHASE - begins at transition to OPS 2 or OPS 8 and ends at transition out of OPS 2 or OPS 8

<u>DEORBIT PHASE</u> - begins at transition to OPS Major Mode 301 and ends at first main landing gear touchdown

<u>LANDING/SAFING PHASE</u> - begins at first main gear touchdown and ends with the completion of post-landing safing operations

B.2 IOA Project Level Ground Rules and Assumptions

The philosophy embodied in <u>NSTS 22206</u>, <u>Instructions for</u>

<u>Preparation of FMEA/CIL</u>, <u>10 October 1986</u>, <u>change 4</u>, <u>3 November 1987</u>
was employed with the following amplifications and additions.

1. The operational flight software is an accurate implementation of the Flight System Software Requirements (FSSRs).

RATIONALE: Software verification is out-of-scope of this task.

2. After liftoff, any parameter which is monitored by system management (SM) or which drives any part of the Caution and Warning System (C&W) will support passage of Redundancy Screen B for its corresponding hardware item.

RATIONALE: Analysis of on-board parameter availability and/or the actual monitoring by the crew is beyond the scope of this task.

3. Any data employed with flight software is assumed to be functional for the specific vehicle and specific mission being flown.

RATIONALE: Mission data verification is out-of-scope of this task.

4. All hardware (including firmware) is manufactured and assembled to the design specifications/drawings.

RATIONALE: Acceptance and verification testing is designed to detect and identify problems before the item is approved for use.

5. All Flight Data File crew procedures will be assumed performed as written, and will not include human error in their performance.

RATIONALE: Failures caused by human operational error are out-of-scope of this task.

6. All hardware analyses will, as a minimum, be performed at the level of analysis existent within NASA/Prime Contractor Orbiter FMEA/CILs, and will be permitted to go to greater hardware detail levels but not lesser.

RATIONALE: Comparison of IOA analysis results with other analyses requires that both analyses be performed to a comparable level of detail.

7. Verification that a telemetry parameter is actually monitored during AOS by ground-based personnel is not required.

RATIONALE: Analysis of mission-dependent telemetry availability and/or the actual monitoring of applicable data by ground-based personnel is beyond the scope of this task.

8. The determination of criticalities per phase is based on the worst case effect of a failure for the phase being analyzed. The failure can occur in the phase being analyzed or in any previous phase, whichever produces the worst case effects for the phase of interest.

RATIONALE: Assigning phase criticalities ensures a thorough and complete analysis.

9. Analysis of wire harnesses, cables, and electrical connectors to determine if FMEAs are warranted will not be performed nor FMEAs assessed.

RATIONALE: Analysis was substantially complete prior to NSTS 22206 ground rule redirection.

 Analysis of welds or brazed joints that cannot be inspected will not be performed nor FMEAs assessed.

RATIONALE: Analysis was substantially complete prior to NSTS 22206 ground rule redirection.

11. Emergency system or hardware will include burst discs and will exclude the EMU Secondary Oxygen Pack (SOP), pressure relief valves and the landing gear pyrotechnics.

RATIONALE: Clarify definition of emergency systems to ensure consistency throughout IOA project.

B.3 Crew Equipment Specific Ground Rules and Assumptions

The IOA analysis was performed to the component or assembly level of the crew equipment subsystem. The analysis considered the worst case effects of the hardware or functional failure on the subsystem, mission, and crew and vehicle safety.

1. Waist tether is used to fasten a crewmember to either a workstation or to the ERCM safety tether. It is not used to restrain tools.

RATIONALE: Worst case possibility.

2. The Operational Bioinstrumentation System (OBS) will be considered as a non-mandatory item for EVA operations. Failure of the OBS while monitoring an IVA crewmember can require the Flight Surgeon to terminate the mission. Thus, IVA usage is more critical.

RATIONALE: IVA crewmembers are hooked to the OBS only at the request of the Flight Surgeon. If a crewmember's health cannot be monitored, the Flight Surgeon has the option of terminating the mission.

3. Crew actions, planned and unplanned, are considered viable alternatives for overcoming failures and reducing criticalities.

RATIONALE: Crew equipment is designed to permit this capability.

4. "Normally expected environmental conditions" precludes the existence of contamination in all water lines.

RATIONALE: Interpretation and application of redundancy screen C.

5. Lockers are assumed to contain emergency, lifesaving, or IFM critical equipment.

RATIONALE: Worst case possibility.

6. Crew equipment failures discovered prior to launch will be corrected prelaunch.

RATIONALE: Interpretation of flight rules.

7. RMS jettison is considered unlike redundancy to RMS stowing.

RATIONALE: Definition of redundancy.

8. The EMU lights are not designated as mandatory items during EVA.

RATIONALE: Definition of mandatory versus non-mandatory requirements.

9. The failure of an EVA tether such that the crewmember is unrestrained will be assigned a "1/1" criticality.

RATIONALE: Worst case possibility

10. Certain galley and OWDA failures can result in free water in the cabin. It is not a part of this task to identify the hazards that free water can pose to other on-board systems.

RATIONALE: This should be addressed by a "hazard analysis".

11. Complete loss of the galley will not terminate a mission as long as alternate water sources are available.

RATIONALE: The FDF contains procedures to bypass the galley for water if required. Other galley functions are not required for completion of mission.

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APPENDIX C DETAILED ASSESSMENT

This section contains the IOA assessment worksheets generated during the assessment of this subsystem. The information on these worksheets facilitates the comparison of the NASA FMEA/CIL (Pre and Post 51-L) to the IOA detailed analysis worksheets included in Appendix E. Each of these worksheets identifies the NASA FMEA being assessed, corresponding MDAC Analysis Worksheet ID (Appendix E), hardware item, criticality, redundancy screens, and recommendations. For each failure mode, the highest assessed hardware and functional criticality is compared and discrepancies noted as "N" in the compare row under the column where the discrepancy occurred.

LEGEND FOR IOA ASSESSMENT WORKSHEETS

Hardware Criticalities:

- 1 = Loss of life or vehicle
- 2 = Loss of mission or next failure of any redundant item
 (like or unlike) could cause loss of life/vehicle
- 3 = All others

Functional Criticalities:

- 1R = Redundant hardware items (like or unlike) all of which,
 if failed, could cause loss of life or vehicle
- 2R = Redundant hardware items (like or unlike) all of which, if failed, could cause loss of mission

Redundancy Screens A, B and C:

- P = Passed Screen
- F = Failed Screen
- NA = Not Applicable

NASA Data:

Baseline = NASA FMEA/CIL

New = Baseline with Proposed Post 51-L Changes

CIL Item :

X = Included in CIL

Compare Row:

N = Non compare for that column (deviation)

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LEAD ANA	LYST	:	s.K.	SINC	LAIR									
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LEAD ANALYST:	s.k. sinclai	R							
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LEAD ANALYST:	s.K. SINCE	LAIR			
ASSESSMENT:					
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LEAD ANALYST:	s.K. SINCLAIR			
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ASSESSMI ASSESSMI NASA FMI	ENT	ID:	CRWI	EQP-14					ASA DA BASELI 1	INE	[[x]
SUBSYSTIMDAC ID: ITEM: LOCK			1404	•			RAINT	PLA!	rfor m	ASS	EMBI	Y HEEL
LEAD AND	ALYS'	T:	н. 9	NOXA								
ASSESSMI	ENT:											
		TICAL FLIGH		F	REDUN	DANCY	SCREI	ens			CIL ITEM	ī
		DW/FU		A		В		С				•
NASA IOA	[[3 /2R 3 /2R]	[E	?] ?]	[P [P]	[P]		[] *
COMPARE	[/]	[3	[]	[]		[]
RECOMMEN	IDAT	ions:	. (1	f dif	fere	nt fro	om NAS	SA)				
	[/]	[]	[] .	Ę.]	(AD	[D/DE] LETE)
* CIL RI		TION	RATIO	NALE:	(If	appl	icable	Al	DEQUAT DEQUAT		[]

ASSESSMENT DATE: 11/16/87 ASSESSMENT ID: CRWEQP-1410 NASA FMEA #: JSC22480-5A SUBSYSTEM: CREW EQUIPMENT MDAC ID: 1410														ASA DAS BASELII Ni		[x]	
MDAC ID: ITEM: ASSEMBLY		NB(14 PO	10 RTAE	-				ST:	RAINT	TI	ELI	SCOPI	NG	во	OM	,	
LEAD ANA	LYS	ST	:	н.	SAX	ON	Ī												
ASSESSME	NT:	:																	
		F.	ICALI LIGHT	r			RI A	EDUNI	DAN	CY B	SCRE	ENS	s c			CI	L EM	[
NASA IOA	[3	/2R /2R]]	P P]	[P P]	[P P]		[]	*
COMPARE	[/)		[]	[1	[]		[]	
RECOMMEN	IDA:	ΓI	ons:		(If	di	fi	fere	nt	fr	om NA	SA)						
•	[/]		[]	[]	[]	(AI	[DD/	DE] LE	ETE
* CIL RI	ETEI	NT:	ION 1	RAT	'IONA	LE	E:	(If	ap	pl	icabl			DEQUAT:		[]	

ASSESSMI NASA FMI SUBSYSTI MDAC ID:	ASSESSMENT DATE: 11/16/87 ASSESSMENT ID: CRWEQP-1411 NASA FMEA #: JSC22480-6A SUBSYSTEM: CREW EQUIPME MDAC ID: 1411 ITEM: PORTABLE FOO ASSEMBLY OUTBOARD CLAMP LEAD ANALYST: H. SAXON									STI	RATN	ጥ ጥ	1	BAS1	DATA ELINE NEW	[X		
								. 001)1 11·G	50	OH		
LEAD ANA	ALY	ST	:	Η.	. SA	KOI	1												
ASSESSMI	ENT	:																	
	CR		ICAL		Č		RI	EDUNI	DAN	CY	SCR	EEN	S			CI			
]		LIGH W/FU	_			A			В			С			LT	EM		
NASA IOA	[3	/2R /2R]		[P P]	[P P]	[P P]		[] *	t
COMPARE	[/]		[]	[]	[]		(]	
RECOMMEN	NDA!	rI(ons:		(If	d:	ifi	ferer	nt :	fro	om N	ASA)						
	[/]		[]	(]	[]		[DD/] LEI	ΓE)
* CIL RE		NT:	ION 1	RAT	TION?	ALI	Ξ:	(If	ap	pli	icab	•		_	JATE JATE	[]	
	•																		

SUBSYSTEM:		7 A	1	VASA DATA: BASELINE NEW]
ITEM: ASSEMBLY PLATFORM	PORTABLE I	FOOT REST	RAINT TEI	LESCOPING	BOOM	
LEAD ANALYST:	H. SAXON					
ASSESSMENT:						
CRITICAL: FLIGHT HDW/FUI	r	EDUNDANCY B		2	CIL	ſ
NASA [3 /2R IOA [3 /2R] [P] [P] []	?] ?]	[] *
COMPARE [/] [) [] [3	[]
RECOMMENDATIONS:	(If diff	ferent fro	om NASA)			
[/] [] [] [] (Al	[DD/DE] ELETE
* CIL RETENTION I	RATIONALE:	(If appl:	i	ADEQUATE ADEQUATE	[]

ASSESSME ASSESSME NASA FME	ENT I	D:	CRWE	QP-1					ASA DATA BASELINE NEW	•	
SUBSYSTE MDAC ID: ITEM: ASSEMBLY				ABLE			'RAIN	T TELI	ESCOPING	ВОС	DM .
LEAD ANA	LYST	:	H. S.	AXON						•	
ASSESSME	NT:										
	F	ICAL LIGH W/FU			REDUN A	IDANCY E		EENS C		CII	-
NASA IOA	[3 [3	/2R /2R]	[]	P]	[F]	[P]	[] *
COMPARE	[/]	[1	[]	ľ]	[]
RECOMMEN	DATI	ons:	(I	f di	ffere	nt fr	om N	ASA)			
	[/]	[]	[]	[] (A	[DD/E] ELETE)
* CIL RE	TENT	ION 1	RATIO	NALE:	: (If	appl	icab	AI	DEQUATE DEQUATE	[]

ASSESSMEI ASSESSMEI NASA FMEZ SUBSYSTEI MDAC ID: ITEM: ASSEMBLY	NT A # M:	II ‡:):	CRI JSC CRI 14: POI	WEQP C224 EW E 14 RTAB	-1 80 QU	41 -8 IF	A PMENT		STF	rain ¹	r TI	F	SA DA BASELI N	NE IEW	[[X]	
LEAD ANA	LYS	ST:	:	н.	SAX	ON	ī											
ASSESSME	NT:	:																
		F	ICALI LIGHT	C			RI A	EDUNE	AN	CY B	SCRI	EENS	S C			CIL		
NASA IOA			•			[P P]	[P P]	[P P]		[]	*
COMPARE	[/]		[1	[]	Į]		[]	
RECOMMEN	'DA'	TI	ons:		(If	d :	if:	ferer	ıt	fr	om N	ASA)					
	ĺ		/]		[•]	[]	[]	(A	[DD/E) EL	ETE)
* CIL RE	TE	NT	ION	RAI	'ION	AL	E:	(If	ap	pl	icab			DEQUA DEQUA		[]	

ASSESSMENT DATE: 11/17/87 ASSESSMENT ID: CRWEQP-1415 NASA FMEA #: JSC22480-8B SUBSYSTEM: CREW EQUIPMENT																		A DA	INE]	
SUBSYST MDAC ID ITEM: ASSEMBL	:				14 P(415 ORTA	BL	E	FOO		RE	ST	RA:	Int	T	EL	ESC	OP:	[NG	ВС	MOC		
LEAD AN	ALY	ST	!:		H	. SA	XO	N															
ASSESSM	ENT	:																					
		F	LI	CAL: GH':	r			RI A	EDU	JND2	ANG	CY B	s	CREI	ENS	s C				CI	L EM		
NASA IOA	[3 3	/	2R 2R]		[P P]]	P P]		[P P]			[]	*
COMPARE	[/	•]		[]		[]		[]			[.])	
RECOMMEN	IDA'	rI(ON	s:		(If	đi	Ĺfi	fer	ent	: 1	fro	m	NAS	A)								
	[/	•].		[]		[]		[,]		(Al	[DD/	DEI	Œ'	ГE
* CIL RE		NT:	10	N F	TAS	ION	ALE	E:	(I	fa	pp	li	.ca		-			UAT UAT		[]		

,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	CRWEQP-1416 JSC22480-9A	NEW	[x]
MDAC ID:		RESTRAINT TELESCOPING	BOOM
LEAD ANALYST:	H. SAXON		
ASSESSMENT:			
CRITICAL: FLIGHT		ANCY SCREENS	CIL ITEM
HDW/FUI	NC A	В С	
NASA [3 /2R IOA [3 /2R] [P]] [P]	[P] [P] [P] [P]	[] *
COMPARE [/] []	[] []	[]
RECOMMENDATIONS:	(If differen	at from NASA)	
(/	1 [1	[] [] (A)	[DD/DELETE)
* CIL RETENTION	RATIONALE: (If	applicable) ADEQUATE INADEQUATE	[]

ASSESSM	ASSESSMENT DATE: 11/17/87 ASSESSMENT ID: CRWEQP-1417 NASA FMEA #: JSC22480-10A SUBSYSTEM: CREW EQUIPMENT MDAC ID: 1417															ASA DA BASEL		[x]]	
SUBSYSTI MDAC ID ITEM: ASSEMBLY	:			14 PC	17 RTA	BL				ES	ST)	RA]	INT	T	ELI	ESCOP:	ING	ВС	OM		
LEAD AND	ALY.	ST	:	H.	SA	XO	N														
ASSESSMI	ENT	:																			
		F	ICAL: LIGH: W/FUI	r			RI A	EDUI	NDA	NC	CY B	sc	CREE	ENS	S C			CI IT	L EM		
															_						
NASA IOA	[3	/2R /2R]		[P P]]	P P]		[P P]		[:) ³	k
COMPARE	[/]		[]		[]		[]		[]	1	
RECOMMEN	IDA'	ric	ONS:		(If	đ	ifi	fere	ent	f	rc	m	NAS	A)							
	[/ ,]		[]		[]		(]	(AI	[/Q/	DEI	EI	È
* CIL RE		NT)	ION F	TAS	ION	ALI	Ξ:	(If	a]	pp	li	.ca				EQUAT EQUAT		[]		

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:		18 10B		ASA DATA: BASELINE NEW	_]
MDAC ID:	CREW EQUII 1418 PORTABLE I LIMITER		RAINT TEL	ESCOPING	BOOM	
LEAD ANALYST:	H. SAXON					
ASSESSMENT:						
CRITICALI FLIGHT HDW/FUN	ר	EDUNDANCY B	SCREENS C		CIL ITEM	
NASA [3 /2R IOA [3 /2R] [P] [P] [P]	[] *]
COMPARE [/] [] [] []	[]
RECOMMENDATIONS:	(If dif	ferent fro	om NASA)			
[/] [] [] [] (Al	[DD/DE] LETE)
* CIL RETENTION F	RATIONALE:	(If appl	A	DEQUATE DEQUATE	[]

ASSESSM ASSESSM NASA FM								ASA DA BASEL	INE		x]								
SUBSYST MDAC ID ITEM: ASSEMBL	:			14 P(BL	E :			ES	T	RAIN	T C	EN'	rerli:	NE	CLA	ΜP	
LEAD AN	ALY	ST	:	н.	SA	XO	N												
ASSESSM	ENT	:																	
		F	ICAL: LIGH: W/FU	r			RI A	EDUN	IDA	NC	Y B	SCR	EEN	s C			CI	_	
NASA IOA	[3	/2R /2R]		[P P]] [P P]	[P P]		[]	*
COMPARE	(/]		[]		[]	[]		[]	
RECOMME	NDA'	ri(ons:		(If	d :	if:	fere	ent	f	ro	om N	'ASA')					
	. [/]		[]		[]	[]	(A	[DD/1	DEL	ETE
* CIL RI			ION 1	RAT	ION	ALI	E:	(If	: a	pp	11	cab	•		DEQUA!		[]	

ASSESSMEN NASA FMEA SUBSYSTEM MDAC ID: ITEM:	ID: 1421								
LEAD ANAL	YST:	H. SAXON							
ASSESSMEN	T:								
c	RITICALI FLIGHT HDW/FUN	י		ANCY SCREE B	ens C	CIL ITEM			
NASA IOA	[3 /2R [3 /2R] [P]	[P] [P]	[P] [P]	[] *			
COMPARE	[/] []	[]	[]	[]			
RECOMMEND	ATIONS:	(If dif	feren	t from NAS	SA)				
	[/] []	[]	[]	[ADD/DELETE)			
* CIL RET	ENTION I	RATIONALE:	(If	applicable	ADEQUATE				

ASSESSM ASSESSM NASA FM	ENT	I	D:	CR	/17/87 WEQP-14 C22480-							
MDAC ID ITEM:	SUBSYSTEM: CREW EQUIPMENT MDAC ID: 1422 ITEM: PORTABLE FOOT RESTRAINT CENTERLINE CLAMP ASSEMBLY ALIGNMENT TABS LEAD ANALYST: H. SAXON											
LEAD AN	ALY	ST	:	H.	SAXON							
ASSESSM	ENT	:										
	CR		ICAI LIGH		R	EDUN	IDANCY	SCI	REENS		CII	
	1		W/FU		A		В	3	C	2		JI'I
NASA IOA	[3 3	/3 /3]]]	[]	[]	[] *]
COMPARE	[/	1	[]	[]	£]	[]
RECOMME	NDA'	ri•	ons.:		(If dif	fere	ent fr	om N	IASA)			
	[/]	[]	[]	[] (.	[ADD/I] DELETE):
* CIL RI		NT:	ION	RAT:	IONALE:	(If	appl	icak	A	DEQUATE]
REMARKS:	:										-	-

ASSESSMEN ASSESSMEN NASA FME	NT I	D:	CRWEQ!	P-142				N	ASA DAT BASELIN NE] K]
SUBSYSTEMDAC ID: ITEM: ASSEMBLY			1423 PORTA			REST:	RAINT	CEN	TERLINE	CLA	ИР
LEAD ANA	LYST	:	H. SA	KON							
ASSESSME	T:										
	F	LIGHT	ITY I 1C	RI A	EDUND	ANCY B	SCRE	ENS C		CII ITI	
NASA IOA	[3	/2R /2R]	[P]	[P]	[P]	[] *
COMPARE	[/]	[]	[]	[]	[]
RECOMMENI	DATI	ons:	(If	diff	erent	t fr	om NAS	SA)			
	[/]	[J	[]	[[ADD/I] DELETE)
* CIL RET	TENT:	ION F	RATIONA	ALE:	(If a	appl:	icable	A	DEQUATE DEQUATE	•]

	CRWEQP-1424	•	NASA DATA: BASELINE NEW	
ITEM: ASSEMBLY CLAMP K	PORTABLE FOO NOB	T RESTRAINT C	ENTERLINE C	LAMP
LEAD ANALYST:	H. SAXON			
ASSESSMENT:				
CRITICAL: FLIGHT HDW/FUI	r	NDANCY SCREENS	c C	CIL ITEM
NASA [3 /2R IOA [3 /2R] [P]	[P] [[P] [P] P]	* []
COMPARE [/] []	[] [1	[]
RECOMMENDATIONS:	(If differ	ent from NASA)	
1] []	[] [] (AI	[DD/DELETE;
* CIL RETENTION :	RATIONALE: (I		ADEQUATE NADEQUATE	[]

ASSESSMENT DATE: 11/17/87 ASSESSMENT ID: CRWEQP-1430 NASA FMEA #: JSC22480-15A SUBSYSTEM: CREW EQUIPMENT MDAC ID: 1430 ITEM: PORTABLE FOOT ASSEMBLY ADJUSTMENT KNOB								r		RAIN	NT A		IASA BASE	LINI NE	E [W [X	•	T	
LEAD ANA	LY	ST	:	н.	SAX	(O)	ī												
ASSESSME	ENT	:																	
		F	ICAL: LIGH: W/FUI	r			RI A	EDUNI	DAN	CY B	SCI	REE	NS C	:			IL TEM	I	
NASA IOA	[3	/2R /2R]		[P P]	[P P]		[E	?]		[]	*
COMPARE	[/]		[]	[]		[]		[]	
RECOMMEN	IĎA'	ri(ons:		(If	đi	Ĺfi	fere	nt	fr	om 1	NAS	A)						
	[/]		[]	[]		(1	(2)/DE		ETE)
* CIL RI		NT	ION 1	RAT	'ION2	ALE	E:	(If	ap	pl	icak		7	ADEQU ADEQU]	

ASSESSMENT DATE: 11/17/87 ASSESSMENT ID: CRWEQP-1431 NASA FMEA #: JSC22480-17A																			
SUBSYSTI MDAC ID ITEM: ASSEMBLY	•			14 PC	31 PRTA	BLI		PMEN' FOOT		ST	RAI	NT A	ARI	ricu	LATI	ИG	soc	KE	T
LEAD AN	ALY	ST	:	н.	SA	10X	1												
ASSESSMI	ENT	:																	
		F	ICAL LIGH W/FU	r			RI A	EDUN	DAN	CY B		REE	NS C	:			IL TEM		
NASA IOA	[3 3	/2R /2R]		[P P]	[P P]		[E	?] ?]		[]	*
COMPARE	[/]		[]	[]		[3		[]	
RECOMME	NDA'	TI(ons:		(If	đi	f	fere	nt	fr	om	NASZ	A)						
	[/]		[(]		[]	(2	ADD,	/DE] LE	TE
* CIL RI		NT:	ION 1	RAT	'ION	ALE	E :	(If	ap	pl:	ica	•	A	_	UATE UATE	[]	
REMARKS:	•																		

ASSESSMEN ASSESSMEN NASA FMEA SUBSYSTEM MDAC ID: ITEM: ASSEMBLY	T ID:	CRWE JSC2 CREW 1432 PORT	QP-1432 2480-17A EQUIPMEN' ABLE FOOT			INE [X	
LEAD ANAL	YST:	H. S	AXON				
ASSESSMEN	T:						
· .	FLI	ALITY GHT FUNC		DANCY SCR	EENS C	CIL ITEM	, ,
NASA IOA	[3 /	2R] 2R]	[P] [P]	[P] [P]	[P] [P]	[] *
COMPARE	[/]	[]	[]	[]	[]
RECOMMEND	ATION	s: (I	f differe	nt from N	ASA)		
	[/	1	[]	[]	[]	[(ADD/DE	
* CIL RET	ENTIO	N RATIO	NALE: (If	applicab	le) ADEQU <i>A</i> INADEQU <i>A</i>]

ASSESSMENT DATE: 11/18/8/ ASSESSMENT ID: CRWEQP-2100 NASA FMEA #: 07-1B-SW2-1														DA'I ELIN NE	ΙE		x]			
SUBSYSTE MDAC ID:				21	EW .00 'A S					SS	E	1BLY	-sı	ΙD	E						
LEAD ANA	LYS	T:	:	s.	K. :	SI	NC:	LAII	R												
ASSESSME	NT:	:																			
	CRI		CAL:		•		R	EDUN	NDA	NC	Y	SCR	EEN	S				CI IT	L EM		
	F	IDV	/FUI	1C			A				В			С							
NASA IOA	[3 3	/3 /2R]		[P]] [P]]	P]] [:]]	*
COMPARE	[/N]		[N]		[N]	[N]			[]	
RECOMMEN	DA I	PI.	ons:		(If	đ	if	fere	ent	f	ro	om N	ASA	.)							
	[/ .]		[3		[]	[]	(DE		TE)
* CIL RE	TEN	[בי	ON I	TAS	ION	AL	E:	(If	f a	pp	11	cab				JATE JATE		[:]	
REMARKS:													_		& -		-	L	•		

NASA FMEA CONSIDERS THE POSSIBILITY OF CONNECTING TETHERS DIRECTLY TO THE SLIDEWIRE AND BYPASSING THE SLIDER. IOA AGREES WITH THIS PROCEDURE AND RECOMMENDS CHANGING CRITICALITY TO NASA FMEA 3/3.

ASSESSMI ASSESSMI NASA FMI	ENT	I	D:	CRW	18/87 EQP-210 1B-SW1-		NASA DATA: BASELINE [] NEW [X]								
SUBSYSTI MDAC ID: ITEM:				210	W EQUII 1 SLIDEV			MBL	-slii	Œ					
LEAD ANALYST: S.K. SINCLAIR															
ASSESSMI	ENT	:													
		F.	LIGH		RI	EDUN	IDANCY					CI II	L EM	1	
]	HDI	W/FU	NC	A		В		C	3	•				
ASAN AOI	[1	/1 /1]	[[]	[]]]	·	[X X]	*
COMPARE	[/]	[]	ľ]	[]		[]	
RECOMMEN	NDA'	ri(ONS:	(If dif	fere	ent fr	om 1	NASA)						
•	[/]	ί]	[]	٠ (]	(A)		/DI		ETE)
* CIL RI	ete)	NT:	ION	RATI	ONALE:	(If	appl	ical	1	ADEQU ADEQU		[x]	

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	CRWEQP-2	: [x]						
	CREW EQU 2102 EVA SLID		SEMBLY-S	LIDE					
LEAD ANALYST:	s.K. SIN	CLAIR							
ASSESSMENT:									
CRITICAL: FLIGHT		REDUNDAN	CY SCREE	NS	CIL ITEM				
	AC	A	В	С					
NASA [3 /3 IOA [3 /2R] [P] [NA]	[] [P]	[) *]			
COMPARE [/N] [и] [и]	[и]	[]			
RECOMMENDATIONS:	(If di	fferent	from NAS	A)					
[/] [] . [1		[DD/DE] LETE)			
* CIL RETENTION H	RATIONALE	: (If ap) ADEQUATE INADEQUATE	[]			
REMARKS: NASA FMEA CONSIDERS THE POSSIBILITY OF HAVING THE CREWMEMBER ATTACH THE TETHER DIRECTLY TO THE SLIDEWIRE AND COMPLETELY BYPASSING THE SLIDE(R). IOA AGREES WITH THIS PROCEDURE AND RECOMMENDS CHANGING CRITS TO MATCH NASA.									

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:			NASA DATA: BASELINE [] NEW [X]								
SUBSYSTEM: MDAC ID: ITEM:	CREW EQUIPM 2103 EVA SLIDEW	MENT IRE ASSEMBLY-STO)P								
LEAD ANALYST:	s.k. sincl	AIR									
ASSESSMENT:											
CRITICALITY REDUNDANCY SCREENS CIL FLIGHT ITEM											
HDW/FU		В	С	2221							
NASA [2 /1R IOA [2 /2] [P]	[P] [[] [P]	[X] *							
COMPARE [/N] [N]] [и] [N]	[]							
RECOMMENDATIONS:	(If diffe	erent from NASA)									
1] [] [] [] (AD	[] DD/DELETE)							
* CIL RETENTION RATIONALE: (If applicable) ADEQUATE [X] INADEQUATE []											
REMARKS: NASA CONSIDERS THE STOP AS A REDUNDANT METHOD OF KEEPING THE EVA CREWMEMBER ATTACHED TO THE SLIDEWIRE. IF THE STOP BREAKS FREE AND THE SLIDEWIRE BREAKS OUT OF THE END FITTINGS, THEN THE											

SLIDE(R) CAN BECOME LOOSE. THIS CAN RESULT IN AN UNRESTRAINED CREWMAN. IOA AGREES WITH THIS ANALYSIS AND RECOMMENDS CHANGING

THE CRITICALITIES TO MATCH NASA.

ASSESSMENT DA ASSESSMENT ID NASA FMEA #:	CRWEQE		NASA DATA: BASELINE [] NEW [X]					
SUBSYSTEM: MDAC ID: ITEM:	2104		NT E-END FITTI	NGS				
LEAD ANALYST:	s.K. s	INCLAI	R					
ASSESSMENT:								
FL	IGHT		NDANCY SCRE		CIL ITEM			
·	/FUNC	A	В	С				
NASA [2]	/1R] /1R]	[P] [P]	[P] [P]	[P] [P]	[X] * [X]			
COMPARE [′]	[]	[]	[]	[]			
RECOMMENDATION	Ns: (If	differe	ent from NA	SA)				
[,	']	[]	[]		[] ADD/DELETE			
* CIL RETENTI	ON RATIONA	LE: (I	applicable	e) ADEQUATE	[X]			
				INADEQUATE				

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:			NASA DATA: BASELINE NEW	
SUBSYSTEM: MDAC ID: ITEM:	CREW EQUIPM 2105 EVA SLIDEWI	ENT RE ASSEMBLY-COT	TER PIN	
LEAD ANALYST:	S.K. SINCLA	IR		
ASSESSMENT:				
CRITICALI FLIGHT HDW/FUN	י	UNDANCY SCREENS B	c C	CIL ITEM
NASA [2 /1R IOA [2 /1R] [P]	[P] [[P] [P] P]	[X] *
COMPARE [/] []	[] [1	[]
RECOMMENDATIONS:	(If diffe	rent from NASA)		
. [\] []	[]]. [.] (A[[DD/DELETE)
* CIL RETENTION F	RATIONALE: (ADEQUATE IADEQUATE	[]

COTTER PIN IS CONSIDERED PART OF THE SLIDEWIRE END FITTING.

ASSESSMENT DATE: 11/19/87 ASSESSMENT ID: CRWEQP-2106 NASA FMEA #: 07-1B-SW5-1 SUBSYSTEM: CREW EQUIPME							06 -1								DATA LINI NEV		x]			
SUBSYSTEM MDAC ID:	M:			21	REW E .06 VA SI					SE	MB:	ry -	- (נשב	CK	DIS	CON	NEO	T	PII	1
LEAD ANA	LYS	ST	•	s.	K. S	II	1C1	LAIR													
ASSESSMENT:																					
•		RI A	EDUN	DAN	ICY E		CREI	ens	s c				IL PEN	1							
			/FUI					_	_										•		
NASA IOA	[3	/1 /1R]		[P]	[F	,]		[P]		[X X]	*	
COMPARE	[N	/N]		[N]	(N]		[N]		[]		
RECOMMEN	DA'	ric	ONS:		(If	di	Ĺfí	fere	nt	fr	om	NAS	SA))							
	[/	3		[]	(j		[]	(2	[ADD,	/DI] ELF	ETE)	ļ
* CIL RETENTION RATIONALE: (REMARKS:								(If	ap	pl	ica	able				ATE ATE	[]		

NASA CONSIDERED THE ENTIRE DEPLOYMENT LINKAGE AND YOKE ASSEMBLY AS ONE ENTITY, WITH NO REDUNDANCIES. UNDER THIS ASSUMPTION, IOA AGREES WITH THE NASA CRITS.

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	11/19/87 CRWEQP-21 07-1B-SW5	07 - 1	NASA DATA: BASELINE NEW	
	CREW EQUI 2107 EVA SLIDE	PMENT WIRE ASSEMBLY -	QUICK DISCO	NNECT PIN
LEAD ANALYST:	s.K. SINC	LAIR		
ASSESSMENT:				
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LEAD ANALYST:	s.k. sinclair	•	
ASSESSMENT:			
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JAMMING OPEN (OR FAILING TO CLOSE) IMPLIES THE HOOK IS NOT IN USE WHEN THE FAILURE OCCURS. FAILURE TO BE ABLE TO USE THE HOOK SHOULD NOT BE A 1/1, AND THE FMEA WILL BE DISCUSSED WITH THE SUBSYSTEM MANAGER.

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SUBSYSTI MDAC ID: ITEM: HOOK				220	_			wmei	MBER S	SAFETY	TETHEF	R-SMALL
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SUBSYSTE MDAC ID:	M:		CREW 2209 ERCM				-CAB	LE TA	KE UP A	ASSEMB	ГЛ
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	CREW EQUIP 2211 ERCM SAFET		HER-	LOCK/	UNLC	OCK SEL	ECTO	R	SWITCH
LEAD ANALYST:	s.k. sinci	LAIR							
ASSESSMENT:									
CRITICALI FLIGHT		EDUNDA	NCY	SCREE	NS		CI	L CEM	
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SUBSYSTE MDAC ID:			CREW 2212 ERCM				8- " D"	' RIN	3		
LEAD ANA	LY	ST:	s.K.	SINC	LAIF	₹					
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LEAD ANALYST:	s.k. sinc	LAIR											
ASSESSMENT:													
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REMARKS:

THIS FAILURE IS UNDER NASA FMEA FAILURE "EITHER HOOK LATCH JAMS OPEN". MDAC FMEA CALLS "FAILS TO CLOSE" A NON-CRITICAL FAILURE SINCE TETHER IS NOT IN USE AT TIME OF FAILURE. FMEA WILL BE DISCUSSED WITH NASA SUBSYSTEM MANAGER.

ASSESSME ASSESSME NASA FME	NT	I		CRW	18/87 EQP-23 17067B					asa Base	LINE]	
SUBSYSTE MDAC ID:				230	W EQUI 2 ST TET									
LEAD ANALYST: S.K. SINCLAIR														
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SUBSYSTEM: MDAC ID: ITEM:	3109	_	LLER LINK		
LEAD ANALYST:	L. GRA	HAM, S.	SINCLAIR		
ASSESSMENT:					
	CALITY IGHT	REDUND	ANCY SCRE	ENS	CIL ITEM
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COMPLETENESS AND WILL BE DISCUSSED WITH THE SUBSYSTEM MANAGER EVEN

THOUGH THIS IS A NON-CRITICAL FAILURE.

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	CRWEQP-3111 TUBE CUTTER	6B	NASA DATA: BASELINE NEW	
	CREW EQUIPMENT 3111 TUBE CUTTER	NT LARGE RATCHET	HANDLE	
LEAD ANALYST:	L. GRAHAM, S	. SINCLAIR		
ASSESSMENT:				
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	CREW EQUIPMENT 3112 TUBE CUTTER SM		HANDLE		
LEAD ANALYST:	L. GRAHAM, S.	SINCLAIR			
ASSESSMENT:					
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IOA AGREES WITH NASA ASSESSMENT.

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SUBSYSTE MDAC ID:			3302	-	PMEN LATCH		RAT	CHET	WHEEL S	ELEC	TOR	TAB	
LEAD ANA	LYSI	: :	L. G	RAHAI	1, S.	SINC	LAIF	2		,			
ASSESSME	NT:												
CRITICALITY REDUNDANCY SCREENS CIL FLIGHT ITEM													
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SUBSYSTE MDAC ID: ITEM:	M:		CREW 3303 3-POI				RATCI	ŀET	WHEEL S	SELEC	TOR	TAB
LEAD ANA	LYS'	T:	L. GR	AHAM,	, s.	SINC	LAIR					
ASSESSME	NT:											
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	CRWEQP-330 CENTERLINI	E LATCH 50				
LEAD ANALYST:	L. GRAHAM	, s. sinci	LAIR			
ASSESSMENT:						
CRITICALI FLIGHT HDW/FUN	r	EDUNDANCY B		c	CIL	
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ASSESSME	NT:													
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	CREW EQUIP 3307 3-POINT LA		COMPE	NSATOR ASS	EMBLY
LEAD ANALYST:	L. GRAHAM,	s. sinci	LAIR		
ASSESSMENT:					
CRITICAL FLIGH	T	DUNDANCY	SCREE		CIL ITEM
HDW/FU	NC A	В		С	
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RECOMMENDATIONS:	(If diff	ferent fro	om NAS	A)	
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ASSESSME	NT:														
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LEAD AN	ALY	ST	:	L.	GRA	ιНИ	M,	s.	SI	NCI	LAIR							
ASSESSM	ENT	:																
	ICAL: LIGH: W/FUI	r			RI A	EDUNE	AN	CY B	SCRE	ENS	S C			CIL				
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LEAD ANA	LYST	•	L. GR	MAHA	, s.	SINC	LAI	R			
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	3403	T MOUNT ASSEMBLY	LARGE CONTROL
LEAD ANALYST:	L. GRAHAM, S.	SINCLAIR	
ASSESSMENT:			
CRITICAL FLIGH HDW/FU	T	B C	CIL ITEM
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	3404	ENT ND MOUNT ASSEME	BLY LARGE O	CONTROL
LEAD ANALYST:	L. GRAHAM, S	S. SINCLAIR		
ASSESSMENT:				
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LEAD ANALY	ST:	L. GRAH	AM, S.	SINCLAIR		
ASSESSMENT	:					
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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	CRWEOP-3407		SA DATA: ASELINE [] NEW [X]
	3407	r Mount Assembly	ROPE
LEAD ANALYST:	L. GRAHAM, S.	SINCLAIR	
ASSESSMENT:			
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LEAD ANA	LY	ST	:	L.	GRAHAM	, s.	. SINC	LAIR	!					
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LEAD ANA	LYS	T:	}	L.	GRA	HA	M,	s.	S	ENC	CL	AIR								
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MDAC ID:	CREW EQUIPMENT 3415 EVA WINCH AND		GEARS
LEAD ANALYST:	L. GRAHAM, S.	SINCLAIR	
ASSESSMENT:	•		
CRITICAL: FLIGH	r	ANCY SCREENS B C	CIL ITEM
HDW/FU			
NASA [2 /1R IOA [2 /1R] [P]] [P]	[P] [P [P] [X] *] [X]
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SUBSYSTE MDAC ID: ITEM:			CREW 3416 EVA W				IT AS	SEMBL	Y PIP PI	N	
LEAD ANA	LYST	:	L. GR	AHAM	, s.	SINC	LAIR				
ASSESSME	ENT:										
		LIGHT	ľ			DANCY				CIL	
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SUBSYSTE MDAC ID: ITEM:			3417	_			r ass	EMBL	Y ROPE S	POOL				
LEAD ANA	LYST	:	L. GR	MAHA	, s.	SINC	LAIR							
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LEAD ANALYST:	L. GRAHAM,	S. SINCLAIR		
ASSESSMENT:				
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SUBSYSTI MDAC ID: ITEM: REEL				36	11					N 1	DEV	CE	AS	SSE	EMBLY	SP	RING	3	STORAGE
LEAD AND	LY	ST	:	L.	GRA	\HA	M,	s.	SI	NC	LAI	R							
ASSESSMI	ENT	:																	
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AGREE WITH NASA CRITICALITY. CHANGE IOA TO MATCH NASA.

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SUBSYST MDAC II ITEM:			CREW 3612 PAYL				DEVI	CE AS	SEMBL	/ RAT	CF	IET	LATCH
LEAD AN	ALYS'	T:	L. G	RAHAM	ı, s.	SINC	LAIR						
ASSESSM	ENT:												
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SUBSYSTEM: MDAC ID: ITEM:	CREW EQUII 3613 PAYLOAD RI		DEVICE	ASSEMBLY R	ATCHET LATCH							
LEAD ANALYST:	L. GRAHAM	, s. sinc	LAIR									
ASSESSMENT:												
		EDUNDANCY	SCREEN	is	CIL ITEM							
	CRITICALITY REDUNDANCY SCREENS FLIGHT HDW/FUNC A B C											
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SUBSYSTEMDAC ID: ITEM: ASSEMBLY			3614 PAYL	EQUI:		T TION [)EVI	CE AS	SEMBI	LY R	AΤC	:HE	T	
LEAD ANA	LYST	:	L. G	RAHAM	, s.	SINC	AIR							
ASSESSME	NT:													
	F	LIGH				DANCY	SCR		•		C1	L EM	1	
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SUBSYSTI MDAC ID: ITEM: ASSEMBLY	•			36: PA:				DEVI	CE AS	SEMBLY	RATO	CHE'	r	
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SUBSYSTEM MDAC ID: ITEM: CONNECT P		CREW EQU 3616 PAYLOAD			DEVIC	E AS	SEMBLY	ноок	/WEB
LEAD ANAL	YST:	L. GRAHA	M, S.	SINC	LAIR				
ASSESSMEN	T:								
C	RITICALI FLIGHT HDW/FUN	ľ		DANCY B	SCRE	ens C	:	CI IT	
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	CREW EQUII 3700 EVA CABLE					
LEAD ANALYST:	L. GRAHAM	, s. sinci	LAIR			
ASSESSMENT:						
CRITICAL FLIGH HDW/FU	T	EDUNDANCY B		c	CIL	1
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REMARKS:						

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LEAD ANA	LY	ST	:	L.	GR	AH	AM.	, s.	sı	INC	LAI	R							
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	CRWEQP-3702	E	ASA DATA: BASELINE [NEW [X]
ITEM:	EVA CABLE CUTTER			
LEAD ANALYST:	L. GRAHAM, S. SI	NCLAIR		
ASSESSMENT:				
CRITICALI FLIGHT HDW/FUN	?	CY SCREENS B C	CIL ITEM	
NASA [3 /2R IOA [3 /2R] [P] [P] [P P]] [] *
COMPARE [/) [] [1 [] []
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THIS FAILURE IS FOR A HOOK LATCH FAILING TO OPEN (OR JAMMING CLOSED). SINCE THE ITEM IS NOT IN USE AT THE TIME OF THE FAILURE AND ALTERNATE MEANS OF SECURING ARE AVAILABLE, THE 3/3 CRITICALITY IS MORE REALISTIC. THEREFORE, IOA RECOMMEND CHANGING THE CRITICALITY OF THIS ITEM TO THE NASA CRITICALITY.

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:)1 OCK 2F	NASA DAT BASELIN NE	
	CREW EQUIE 3801 SNATCH BLO		LY HOOK SWIVEL	
LEAD ANALYST:	L. GRAHAM,	s. SINCL	AIR	
ASSESSMENT:				
CRITICAL FLIGH HDW/FU	r	EDUNDANCY S	screens C	CIL ITEM
NASA [2 /1R IOA [2 /1R] [P] [P] [P]	[P]] [P]	[X] * [X]
COMPARE [/] [] [] []	[]
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REMARKS:				

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	11/19/87 CRWEQP-38 SNATCH BL	02 OCK 2D		NASA DATA BASELINE NEW	
SUBSYSTEM: MDAC ID: ITEM:	CREW EQUI: 3802 SNATCH BLA		BLY RIG	CHT SPRING	PLUNGER
LEAD ANALYST:	L. GRAHAM	, s. sinc	LAIR		
ASSESSMENT:					
CRITICAL: FLIGHT		EDUNDANCY	SCREEN	ıs	CIL ITEM
HDW/FU		В	ı	С	
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REMARKS: NOTE: NASA FMEA PLUNGERS IDENTICA					EFT AND RIGHT

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SUBSYSTE MDAC ID: ITEM:			CREW 3802 SNATC				BLY	RIGH	T SPRIM	1G PL	UNGER	t		
LEAD ANA	LYST	:	L. GR	MAHA	, s.	SINC	LAIR	1						
ASSESSME	NT:													
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LEAD ANA	LYS	T:	L. (RAHAM,	, s.	SINC	LAIR	•				
ASSESSME	NT:											
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LEAD ANA	LY	ST	:	L.	GRAHAM,	, s.	SINC	LAIR							
ASSESSME	ASSESSMENT: CRITICALITY REDUNDANCY SCREENS CIL														
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SUBSYSTE MDAC ID: ITEM:			CREW 3806 SNATO	_			ßLY	PULLI	EY WHE	EL					
LEAD ANA	LYST	:	L. GI	RAHAM	, s.	SINC	CLAIR	•							
ASSESSME	ASSESSMENT: CRITICALITY REDUNDANCY SCREENS CIL														
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ASSESSME	ENT	:												
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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:			NASA DATA BASELINE NEW	
MDAC ID:	CREW EQUIPMENT 4300 IFM BREAKOUT BO	OX INPUT PO	VER CONNECT	ror
LEAD ANALYST:	L. GRAHAM, S. S	SINCLAIR		
ASSESSMENT:				
CRITICALI FLIGHT HDW/FUN	r	ANCY SCREENS B	c C	CIL ITEM
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SUBSYSTEM: MDAC ID: ITEM:		CREW EQU 4304 IFM BREA			UTPUT	POW	ER CONN	ECTOR	2
LEAD ANALY	ST:	L. GRAHA	M, S.	SINC	LAIR				
ASSESSMENT	!:								
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LEAD ANA	LYS	ST	:	L.	GRA	MAHA	i, s.	SINC	LAIR	t					
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ASSESSME	NT:																				
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	CREW EQUIPMENT 4307 IFM BREAKOUT BOX FUSE HOLD	ER	
LEAD ANALYST:	L. GRAHAM, S. SINCLAIR		
ASSESSMENT:			
CRITICAL: FLIGHT		CIL ITEM	
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LEAD ANA	LYS	ST:	:	L.	GRAHAI	M, S.	SINC	LAIR						
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SUBSYSTEM: MDAC ID: ITEM:		CREW EQUI 4309 IFM BREAK		AWG OUT	PUT SELECT	SWITCH	(SW3)
LEAD ANALYS	T:	L. GRAHAM	, s. sin	CLAIR			
ASSESSMENT:							
	TICALI FLIGHT		EDUNDANC	Y SCREE	ens	CIL ITEM	
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ASSESSMENT ID: NASA FMEA #:	CRWEQP-	37 -4310		BASEL:	INE [] NEW []
SUBSYSTEM: MDAC ID: ITEM:	4310		ONNECTION (OUTLET	
LEAD ANALYST:	L. GRAI	HAM, S.	SINCLAIR		
ASSESSMENT:					
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LEAD ANA	LYST	?:	L. GF	MAHAS	, s.	SINC	LAIR						
ASSESSME	NT:												
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REMARKS:										_	L	,	

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SUBSYSTE MDAC ID:	M:		CREW 1 4312 IFM BI				/ARIA	BLE V	OLTAGE F	OWER	SUPPLY
LEAD ANA	LYSI	::	L. GR	AHAM	SINC	CLAIR					
ASSESSME	NT:										
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SUBSYSTE MDAC ID:				43	CREW EQUIPMENT 4313 IFM BREAKOUT BOX						AR:	IABI	Æ	V	OLTAGE	PC	WER	st	JPP	LY
LEAD ANALYST: L. GRAHAM, S. S.								. sı	NC	LA:	IR									
ASSESSME	ENT	:																		
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SUBSYSTE MDAC ID:			4314	1			8 V/	VARI <i>I</i>	ABLE SW	ITCH	(SW2)
LEAD ANA	LYS	ST:	L. (GRAHAM	, s.	SINC	LAIR				
ASSESSME	NT:	;									
	CRI	TICAI FLIGH		R	EDUN	IDANCY	SCR	EENS		CI: IT:	
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SUBSYSTI MDAC ID: ITEM:			431	.5			8 V/	'VARIA	BLE SWI	TCH	(SW2)
LEAD ANA	ALYS	T:	L.	GRAHAI	M, S.	SINC	LAIF	t			
ASSESSME	ENT:										
		TICA FLIG DW/F			REDUN A	DANCY B		REENS C		CI:	
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SUBSYSTEM MDAC ID:			CREW 4316 IFM I	_			WG OI	UTPUT	SELECT	SWIT	CH (SW4)	
LEAD ANA	LYST	!:	L. GI	RAHAM	ı, s.	SINC	LAIR					
ASSESSME	NT:											
,	F	LIGH				DANCY				CIL ITE		
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SUBSYSTI MDAC ID: ITEM:				431			IT BOX A	NG (OUTPUT	SEL	ECT S	SWI	гсн	(SW4)
LEAD ANALYST: L. GRAHAM, S.								LAII	2					
ASSESSMI	ENT:	:												
CRITICALITY FLIGHT HDW/FUNC							ndancy -	SCI				CI		
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SUBSYSTE MDAC ID: ITEM:	M:			CREW 1 5101 GALLEY			EATE	R CIR	CUIT	BREAKER	ł	
LEAD ANA	LYS	T:		s.K. 8	SINC	LAIR						
ASSESSME	NT:											
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SUBSYSTE MDAC ID:		CREW EQ 5105 POTABLE			ER TE	LEME	TRY					
LEAD ANA	LYST:	s.k. si	NCLAIR									
ASSESSME	ENT:											
CRITICALITY REDUNDANCY SCREENS CIL FLIGHT ITEM HDW/FUNC A B C												
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SUBSYSTEM: MDAC ID: ITEM:	CREW EQUIPM 5106 RECIRCULATI					
LEAD ANALYST:	S.K. SINCLA	IR				
ASSESSMENT:						
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SUBSYSTIMDAC ID				CREW 5107 RECIR	_		PUMP						
LEAD AN	ALY	ST	:	s.K.	SINC	LAIR							
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LEAD AN	ALY	ST	:	s.K.	SINC	CLAIR	R							
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ASSESSMENT:						
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LEAD ANA	LYST	r:	B. RI	CHAR	D						
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	MASA DID NOT CONSIDER THIS FAILURE SIGNIFICANT AND DID NOT												

ASSESSMENT DATE: 12/01/87 ASSESSMENT ID: CRWEQP-5161 NASA FMEA #: 1.9.2									N	iasa di Baseli]	
SUBSYSTE MDAC ID:				516	1		NT NATER	FEE!	D SOLE	NOID/	VALVI	Ξ		
LEAD ANA	LY	ST	;	в.	RICHAI	RD								
ASSESSME	ENT	:												
CRITICALITY RED FLIGHT HDW/FUNC A							IDANCY B	SCI	REENS	!		CIL CTE		
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REMARKS:

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SUBSYSTE MDAC ID:	M:		5162	_			FEED	SOL	ENOID/V	ALVE	
LEAD ANA	LYS	T:	B. RI	CHAR	D						
ASSESSME	NT:		ē								
	CRI	TICAL FLIGH		R	EDUNI	DANCY	SCRE	ENS		CI	
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ASSESSME ASSESSME NASA FME	NT	ID:		01/87 EQP-51 .2			ŀ	NASA DA' BASELII N	NE [;]	
SUBSYSTE MDAC ID:			5163			T LENOI	D VA	LVE			
LEAD ANA	LYS	ST:	в. 1	RICHAF	SD.						
ASSESSME	NT:	}									
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SUBSYSTEMDAC ID:			CREW 5164 RHS C				ID VA	LVE				
LEAD ANA	ALYST	:	B. RI	CHAR	D							
ASSESSMI	ENT:											
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SUBSYSTE MDAC ID:				51	EW EQUI .65 IS BYPA		D V	ALVE					
LEAD ANA	LY	ST	:	в.	RICHAI	RD							
ASSESSME	NT	:											
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SUBSYSTE MDAC ID: ITEM:			CREW 5166 RHS B	-			D VA	LVE							
LEAD ANA	LYST	:	B. RI	CHAR	D										
ASSESSME	ASSESSMENT: CRITICALITY REDUNDANCY SCREENS CIL														
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SUBSYSTE MDAC ID:	M:		CREW 5167 HOT V				зн ви	TTON	SWITCH			
LEAD ANA	LYSI	: :	B. RI	CHAR	D							
ASSESSME	NT:											
		ICAL		R	EDUN	DANCY	SCR	EENS		CII		
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SUBSYSTE MDAC ID:	M:		CREW 5168 HOT W				H BUT	PTON	SWITCH				
LEAD ANA	LYST	r:	B. RI	CHAR	D								
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SUBSYSTE MDAC ID:				51	EW EQUII 69 T WATER			сн	- LIG	HT				
LEAD ANA	LY	ST	:	В.	RICHARI)								
ASSESSME	NT	:												
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LEAD ANA	LYS	ST	:	в.	RICHARI)								
ASSESSME	NT:	:												
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	1		LIGH W/FU		A		E	3	(3		#11	2141	
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SUBSYSTEM MDAC ID:	M:		CREW 5171 COLD			LATIO	N SO	LENOID/	VALV	E	
LEAD ANA	LYS'	T:	B. RI	CHAR	D						
ASSESSME	T:										
(TICAL FLIGH	r				SCRE			CI IT	
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SUBSYSTE MDAC ID: ITEM:	M:		CREW 5172 COLD				ILATI	on so	LENOID)/V <i>I</i>	LVE	:	
LEAD ANA	LYST	:	B. RI	CHAR	D								
ASSESSME	NT:												
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SUBSYSTE MDAC ID:			CREW 5173 RHS N	_		T								
LEAD ANA	LYST	:	B. RI	CHAR	D									
ASSESSMENT:														
ASSESSMENT: CRITICALITY REDUNDANCY SCREENS CIL FLIGHT ITEM HDW/FUNC A B C														
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THEREFORE DID NOT ANALYZE IT FOR FAILURES.

ASSESSME NASA FME	NT	I		CRWE	QP-51	75			N	BASELII N		_]	
SUBSYSTE MDAC ID:				CREW 5175 RHS			IT Iner pi	NRAL	LEL R	ODS				
LEAD ANA	LY	ST	:	B. R	ICHAR	D								
ASSESSME	NТ	:												
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ASSESSMENT DATE: 12/01/87 ASSESSMENT ID: CRWEQP-5176 NASA FMEA #:									ì	NASA DA Baseli 1]	
SUBSYST MDAC ID ITEM:				5176			NT INER P	'ARAL	LEL I	RODS				
LEAD AN	ALY	ST	:	B. R	ICHAR	D								
ASSESSM	ENT	:												
CRITICALITY REDUNDANCY SCREENS FLIGHT												CIL		
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SUBSYSTEM: MDAC ID: ITEM:	CREW EQUI 5177 RHS "TRAN			iamber									
LEAD ANALYST:	B. RICHAR	.D											
ASSESSMENT:													
CRITICAL FLIGH		CIL	,										
HDW/FU	_		В		С		ITEM	1					
NASA [/ IOA [3 /3] []	[]	[] []		[]	*				
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ASSESSME ASSESSME NASA FME	NT ID:	: (3				ASA DATA BASELINE NEW				
SUBSYSTE MDAC ID:		5	CREW E(5178 INLET V			NECT	ONS						
LEAD ANA	LYST:	F	B. RICE	HARD									
ASSESSMENT:													
CRITICALITY REDUNDANCY SCREENS CIL FLIGHT ITEM													
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ASSESSMENT DAT ASSESSMENT ID: NASA FMEA #:		-5179		NASA DATA BASELINE NEW	
SUBSYSTEM: MDAC ID: ITEM:	CREW EQ 5179 INLET W		r ONNECTIONS	1	
LEAD ANALYST:	B. RICH	IARD			
ASSESSMENT:					
CRITIC FLI		REDUNI	DANCY SCRE	ENS	CIL ITEM
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ASSESSME ASSESSME NASA FME	80				1	NASA BASE	LINE		-					
SUBSYSTE MDAC ID: ITEM:	M:		CREW 5180 MANUA				/AL	VE						
LEAD ANA	LYST	:	B. RI	CHAR	D									
ASSESSME	NT:													
CRITICALITY REDUNDANCY SCREENS CIL FLIGHT ITEM HDW/FUNC A B C														
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COMPARE	[/N]	[N]	[N]	[]	ן א		[j	
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ASSESSMENT ID: NASA FMEA #:	CRWEQP	31			1	Basei	NEW NEW	_]		
SUBSYSTEM: MDAC ID: ITEM:	CREW EG 5181 AUXILI		- PC	TABLI	e wa:	TE R					
LEAD ANALYST:	B. RIC	HARD)								
ASSESSMENT:											
CRITICA		RE	DUNDA	NCY	SCREI	ens			CIL	•	
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SUBSYSTEMDAC ID:	M:		CREW F 5300 OPERAT			rer i	OISPE	NSER	QUICK I	oisco	NNECTS
LEAD ANA	LYST:		L. GRA	HAM	, s. :	SINC	LAIR				
ASSESSME	NT:										
	CALI		R	EDUND	ANCY	SCRE	ENS		CIL		
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REFERENCED IN THE NASA FMEA.

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SUBSYSTI MDAC ID: ITEM:			5301				DISP	ENSER	QUICK	DISCO	NNECTS
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	CIL RETENTION RATIONALE: (If REMARKS:											DEQUATE DEQUATE]	

ASSESSME ASSESSME NASA FME	CRWEO	P-53	03						ASA DATA BASELINE NEW					
SUBSYSTE MDAC ID: ITEM: WATER VA			5303			rer	ı I	ISPEI	NSI	ER	AMBIENT,	/CHI	LLI	ED/OFF
LEAD ANA	LYST	:	L. GR	AHAM	, s. :	SIN	CI	AIR						
ASSESSME	SSESSMENT:													
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THE IOA LEAKAGE,	INADEQUATE [] EMARKS: HE IOA FMEA CARRIES THE OVERALL FAILURE MODE OF EXTERNAL EAKAGE, BUT DESCRIBES THE EFFECTS OF NASA FMEA OWDA-6D - FAILS PEN/INTERNAL LEAKAGE.													

ASSESSME ASSESSME NASA FME	P-53	04				BASEI		[
SUBSYSTEMDAC ID: ITEM: WATER VA			CREW 5304 OPERA	-		T ATER I	ISP	enser	AMB]	ENT/	'CHI	LLED	OFF
LEAD ANA	LYST	•	L. GF	MAHA	, s.	SINCI	AIR	1					
ASSESSME	NT:												
				R	EDUN	DANCY	SCR	REENS			CII		
	_	LIGH W/FU	NC I'	A		В		c	:		110	111	
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* CIL RE		ION	RATIO!	VALE:	(If	appl	icak	1	ADEQU.]	
REMARKS: AGREE WI TEMPERAT	TH N	ASA SHOU	CRITIC	CALIT	Y. SE A	HAVING MISS:	G WA	ATER A	VAIL	ABLE	AТ	ONLY	ONE

ASSESSME ASSESSME NASA FME	NT ID:		QP-5305		NASA D BASEL		(]					
SUBSYSTEMDAC ID:	M:	5305			PENSER PRES	SURE RI	EGULA TOR					
LEAD ANA	LYST:	L. G	RAHAM, S.	SINCLAIR								
ASSESSMENT:												
•	CRITIC FLI	GHT	REDUN	IDANCY SCF	REENS	CII						
	HDW/	FUNC	A	В	С							
NASA IOA	[3 /	2R] 2R]	[P] [P]	[P] [P]	[P] [P]	[[] *]					
COMPARE	[/]	[]	[]	[]	[]					
RECOMMENI	DATION	S: (I	f differe	ent from N	(ASA)							
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* CIL RET	CIL RETENTION RATIONALE: (If applicable) ADEQUATE [] INADEQUATE []											

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	12/02/87 CRWEQP-5306 OWDA-4C	NASA DATA BASELINI NEV	
SUBSYSTEM: MDAC ID: ITEM:	5306	TER DISPENSER PRESSU	RE REGULATOR
LEAD ANALYST:	L. GRAHAM, S.	SINCLAIR	
ASSESSMENT:			
CRITICAL: FLIGH	ITY REDUND	ANCY SCREENS	CIL ITEM
	NC A	В С	LILM
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COMPARE [/N] [N]	[N] [N]	i j
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* CIL RETENTION 1	RATIONALE: (If	applicable) ADEQUATE INADEQUATE	[]
RENDER THE PRESSUE THE LEAK IS SMALL	URE REGULATOR A L, THE OWDA IS	POSSIBILITY THAT THE ND THUS THE OWDA INOI USABLE. HOWEVER, A I PREVENT WATER FROM RE	E LEAKAGE WILL PERABLE. IF LARGE LEAK

MANAGER.

THE CREW. THE ISSUE WILL BE DISCUSSED WITH THE SUBSYSTEM

ASSESSME ASSESSME NASA FME	NT II		12/02 CRWEQ OWDA-	P-5		07						ASA DAT BASELII NI	NE]	
SUBSYSTE MDAC ID:	M:		CREW 5307 OPERA					R I	DISPE	NS1	ΞR	BYPASS	s V	'ALVI	Ξ	
LEAD ANA	LYST:	:	L. GR	AHA	M,	s.	SI	NCI	LAIR							
ASSESSME	NT:															
		LIGH	r			EDUND	ANG		SCRE	ENS				CIL	4	
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REMARKS:																

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SUBSYSTEM MDAC ID: ITEM:	M:		5308	_		ГЕI	R 1	DISPE	NSI	ER	BYPASS	VALV I	E	
LEAD ANA	LYS	r:	L. GR	MAHA	, s. s	SI	(C)	LAIR						
ASSESSME	NT:													
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ASSESSME	NT	:																	
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NASA IOA			/2R /2R			[P P]	<u> </u>	[I	?]		[P] P]		!]	*
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* CIL RE	TE	NT:	ION 1	RAT	CION	AL	E:	(Ii	f ag	p)	.ica		•		QUATE QUATE]	
REMARKS:																			

ASSESSMENT ASSESSMENT NASA FMEA	ID:	CRWEQE	P-53	10					ASA DATA BASELINI NEV			
SUBSYSTEM: MDAC ID: ITEM:		CREW E 5310 OPERAT			rer	DISPE	nsi	ER	SOLENO	ID V	ALVE	
LEAD ANALY	ST:	L. GRA	MAH	, s. s	SINC	LAIR						
ASSESSMENT	:											
CR	ITICAL FLIGH	ITY T	RI	EDUNDA	ANCY	SCRE	ENS	5		CI		
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SUBSYSTEM: MDAC ID: ITEM: SWITCH	5311	-	ER DISPE	NSER ROTARY	SELECTION
LEAD ANALYST	: L. GRA	HAM, S. S	INCLAIR		
ASSESSMENT:					
F	ICALITY LIGHT W/FUNC	REDUNDA A	NCY SCREI	ens C	CIL ITEM
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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	12/02/87 CRWEQP-53 OWDA-2C	12		NASA DATA BASELINI NEV]
SUBSYSTEM: MDAC ID: ITEM:	CREW EQUI 5312 OPERATION		R DISPE	NSER REHYDRA	ATION	NEEDLE
LEAD ANALYST:	L. GRAHAM	, s. sin	ICLAIR			
ASSESSMENT:						
CRITICAL FLIGH	T	EDUNDANG			CIL	
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ASSESSME NASA FME	NT	I		CRWEC	/87 P-53	313			1	nasa i Basei			
SUBSYSTE MDAC ID: ITEM: VALVE				CREW 5313 OPERA				DISP	PENSEI	R MICI	ROBIA	L	СНЕСК
LEAD ANA	LYS	ST	:	L. GR	AHA	ı, s.	SINC	LAIR	2				
ASSESSME	NT	:											
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NASA IOA	[3	/3]	[[]	[)]	[[]]] *]
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RECOMMEN	DA'	rI¢	ons:	(If	di	fere	nt fr	om N	ASA)				
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REMARKS: NO EQUIV. COMPLETE				SA FME	A.	SHOU	LD BE	ADD	ED TO	NASA	DAT	A	BASE FOR

ASSESSME ASSESSME NASA FME	NT	II		CRWI)2/87 EQP-53 A-7A	14				ASA DA'I BASELIN NI]	
SUBSYSTE MDAC ID: ITEM: VALVE	M:			5314	V EQUI I RATION			DISP	ENSER	MICRO	BIAL C	HECK	
LEAD ANA	LYS	5 T :	:	L. (GRAHAM	ı, s.	SINC	LAIR					
ASSESSME	NT:	:				•							
	CR		ICAL LIGH	ITY T	F	EDUN	DANCY	SCR	EENS		CII		
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* CIL RE	TE	NT	ION	RATI	ONALE:	: (If	f appl	icab	1	ADEQUAT]	

REMARKS:

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:			NASA DATA: BASELINE NEW	[]
SUBSYSTEM: MDAC ID: ITEM: VALVE	CREW EQUIPMENT 5315 OPERATIONAL WAT	ER DISPENSE	R MICROBIA	L CHECK
LEAD ANALYST:	L. GRAHAM, S. S.	INCLAIR		
ASSESSMENT:	• .			
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ASSESSMI ASSESSMI NASA FMI	ENT	ID:	CRW	02/87 EQP-53: A-8A	16			1	NASA DA BASELI N]
SUBSYSTI MDAC ID: ITEM: VALVE			531				DISE	PENSEI	R PERSO	NAL H	(GIENE
LEAD AN	ALY	ST:	L.	GRAHAM	, s.	SINC	LAIF	ł			
ASSESSMI	ENT	:									
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REMARKS:

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	12/02/87 CRWEQP-5317 OWDA-8B		NASA DATA BASELINE NEV	
	CREW EQUIPMENT 5317 OPERATIONAL WA		NSER PERSONA	AL HYGIENE
LEAD ANALYST:	L. GRAHAM, S.	SINCLAIR		
ASSESSMENT:				
CRITICAL: FLIGHT	r	ANCY SCRE		CIL ITEM
HDW/FUI	NC A	В	С	
NASA [3 /3 IOA [3 /3] []	[]	[]	[] *
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* CIL RETENTION I	RATIONALE: (If	applicabl	e) ADEQUATE INADEQUATE	[]

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SUBSYSTI MDAC ID: ITEM: VALVE			5318	_			DISP	ensei	R PERSON	AL H	YGIENE
LEAD ANA	ALYS	ST:	L. (GRAHAM	, s.	SINC	LAIR	١.			
ASSESSMI	ENT	:									
	CR	TICAL FLIGH		R	EDUN	IDANCY	SCR	EENS		CII	
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ASSESSME ASSESSME NASA FME	NT	ID:		02/87 EQP-53	119			1	Nasa Base		[]			
SUBSYSTE MDAC ID: ITEM:	M:		CREW 5319 OPER	_			DISP	PENSEI	R HOL	DING	CLI	PS			
LEAD ANA	LYS	T:	L. 0	RAHAN	ı, s.	SING	CLAIR	Ł							
ASSESSMENT:															
1	CRITICALITY REDUNDANCY SCREENS CIL FLIGHT ITEM														
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NASA IOA	[3 /3]	[]	[]]]		[] *]			
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* CIL RE	TEN	TION	RATIO	NALE:	(If	app]	licab	1	ADEQUA		[]			
NO EQUIV	ALE	NT N	ASA FM	EA BU	T IT	SHOU	ILD B	E ADI	ED F	OR C	OMPL	ETENES	ss.		

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	12/02/87 CRWEQP-5320 OWDA-14A	1	NASA DATA: BASELINE NEW	[x]
	CREW EQUIPMENT 5320 OPERATIONAL WAT	TER DISPENSE	R INPUT PO	WER
LEAD ANALYST:	L. GRAHAM, S. S	SINCLAIR		
ASSESSMENT:				
CRITICAL: FLIGHT		ANCY SCREENS		CIL ITEM
HDW/FU	NC A	В	С	
NASA [3 /2R IOA [3 /3] [P]] []	[P] [[] [P]	[] *
COMPARE [/N	ј [и]	[и][N]	
RECOMMENDATIONS:	(If different	t from NASA)		
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REMARKS: THE INPUT POWER CONTROLLER. CRI LOSS OF ALL REDU RESULT IN A LOSS	TICALITY SHOULD NDANT METHODS TO	SUB-PART OF BE CHANGED	TO MATCH 1	LL OWDA NASAS SINCI

ASSESSMENT ASSESSMENT NASA FMEA	ID:	12/02/ CRWEQF OWDA-9	-53	21					ATA: INE [NEW [
SUBSYSTEM: MDAC ID: ITEM:		CREW E 5321 OPERAT			rer	DISP	ENSER	FLEX	LINE		
LEAD ANALY	ST:	L. GRA	HAM	, s. s	SINC	LAIR					
ASSESSMENT	:										
	ITICALI FLIGHT HDW/FUN		RI A	EDUNDA	ANC)				CI IT	L Em	
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REMARKS: THE NASA FN LEAK, IF TA FAILURE.	MEA IS AKEN TO	ACTUAL WORST	LY W	VRITTE SE, CA	N F	OR A E COI	LEAK	AGE IN	THE	LINE.	A

ASSESSMEN ASSESSMEN NASA FMEA	CRW			2						SA DAT BASELIN NI						
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* CIL RE	TEN	TION	RAT]	ONAL	E:	(11	f ap	pl.	ica			DEQUAT DEQUAT		[]	

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ASSESSMI ASSESSMI NASA FMI	ENT	ID:	12/03 CRWEQ CWDA-	P-54	00						ASA DATA BASELINE NEW]
SUBSYSTI MDAC ID: ITEM:			CREW 5400 CONTI				R 1	DISP	ENS:	ER			
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ASSESSME	ENT:												
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REMARKS:									IN		EQUATE EQUATE	[]
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CRITICALITY BE CHANGED TO A 3/2R.

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	CRWEQP-5400A	NASA DATA: BASELINE NEW	[x]
	CREW EQUIPMENT 5400 CONTINGENCY WATER DISPENSE	ER	
LEAD ANALYST:	L. GRAHAM, S. SINCLAIR		
ASSESSMENT:			
CRITICAL FLIGH	ITY REDUNDANCY SCREENS		CIL ITEM
	NC A B	С	
NASA [3 /3 IOA [3 /2F		P]	[] *
COMPARE [/N] [и] [и] [n]	[]
RECOMMENDATIONS:	(If different from NASA))	
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* CIL RETENTION	RATIONALE: (If applicable)	ADEQUATE NADEQUATE	[]
SEVERE ENOUGH TO WOULD DO THIS.	OT CONSIDER THE POSSIBILITY O PREVENT THE USE OF THE CWI IOA RECOMMENDS THAT ASSIGNT	DA. A WORS	T CASE LEAK

ASSESSME ASSESSME NASA FME		CF	P/03 RWEQ VDA-	P-	54	01						ASA DA BASELI N	NE	-	x]			
SUBSYSTE MDAC ID:				54	REW 101 NTI					R I	DIS	PENS	ER					
LEAD ANA	LYS	ST	:	L.	GR	AH	AM	, s.	SI	NC:	LAII	R						
ASSESSME																		
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* CIL RE	TEN	T]	ON F	TAS	ION	ALI	€:	(If	app	pli	cab	•		EQUAT		[]	
REMARKS:																-	-	

ASSESSMENT DA ASSESSMENT ID NASA FMEA #:		QP-5402		NASA DATA BASELINI NEV]
SUBSYSTEM: MDAC ID: ITEM:	5402	EQUIPMENT		enser		
LEAD ANALYST:	L. G	RAHAM, S.	SINCLAIR			
ASSESSMENT:						
FL	CALITY JGHT FUNC	REDUNI A	DANCY SCRI	eens C	CIL	
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COMPARE [/N]	[N]	[и]	[N]	[]
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* CIL RETENTI	ON RATIO	NALE: (If	applicab	le) ADEQUATE INADEQUATE	_]

AGREE WITH NASA CRITICALITIES.

ASSESSME ASSESSME NASA FME	NT	I			4/88 EQP-61	00			N		DATA LINE NEW	[]	
SUBSYSTE MDAC ID:				6100	W EQUI: O EPING :			USTA	ABLE S	TRAF	PS			
LEAD ANA	TA	ST	:	s.K	. SINC	LAIF	t							
ASSESSME	NT	:												
	CR		ICAL LIGH	ITY T	R	EDUN	IDANCY	SCR	EENS			CII		
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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	CRWEQP-63	300	NASA DATA: BASELINE NEW								
SUBSYSTEM: MDAC ID: ITEM:	CREW EQUI 6300 MIDDECK S	PMENT STOWAGE LOCKER DOO	r.								
LEAD ANALYST:	L. GRAHAM	, s. sinclair									
ASSESSMENT:											
CRITICAL FLIGH		REDUNDANCY SCREENS	•	CIL ITEM							
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INADEQUATE [] EMARKS: ASA GROUND RULE STATES THAT LOCKER TOOLS AND MEDICAL SUPPLIES RE ALWAYS STORED IN SEPARATE LOCKERS. THIS WOULD VIRTUALLY ELIMINATE THE POSSIBILITY THAT THE CREW COULD NOT ACCESS MEDICAL SUPPLIES. SUGGEST THAT IOA CRITICALITY BE CHANGED TO 3/3 TO MATCH NASA'S.											

ASSESSME ASSESSME NASA FME	NT	II):		EQP-63	01			1	NASA DAS BASELII NI				
SUBSYSTE MDAC ID:				630	W EQUI 1 DECK S			CKER	DOOI	ર				
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SUBSYSTEM: MDAC ID:	CREW EQU 6303	IPMENT	LOCKER D	OOR	
LEAD ANALYST:	L. GRAHA	M, S. S	INCLAIR		
ASSESSMENT:					
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REMARKS: NASA DOES NOT FEE SIGNIFICANT DAMAG CREW. RECOMMEND MATCH NASA'S.	E TO THE	VEHICL	E OR SIGN	IFICANT INJU	JRY TO THE

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LEAD AN	ALYS'	r:	L. G	RAHAI	M, s.	SIN	CLAIF	t			
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	CREW EQUIPM 6408 TREADMILL E	EXERCISER ASSEM	IBLY ATTACHM	ENT FITTINGS
LEAD ANALYST:	L. GRAHAM,	s. SINCLAIR		
ASSESSMENT:				
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LEAD ANA	LYST	•	L. GF	(AHA)	ı, s.	SINC	LAIF	ł			
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LEAD ANA	LYST	! :	L. (GRAHAN	I, S.	SINC	LAIR				
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LEAD ANAI	LYST:	L. GRAHA	M, s.	SINCLAIR		
ASSESSMEN	NT:					
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COMPARE	[/N] [N]	[и]	[. N]	[]
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SUBSYSTE MDAC ID: ITEM: MOUNTING				65	07			MENT PTICA		AL	GNME	NT	SI	GHT (COF	vs)	FOR	WARD
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SUBSYSTEM: MDAC ID: ITEM: STOP	CREW EQUIPMENT 6508 CREWMAN OPTICAL ALIGNMENT	SIGHT (COAS) APERTURE
LEAD ANALYST:	L. GRAHAM, S. SINCLAIR	
ASSESSMENT:		
CRITICALI FLIGHT HDW/FUN	<u> </u>	C CIL ITEM
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SUBSYSTEM: MDAC ID: ITEM: STOP	CREW EQUIPMENT 6509 CREWMAN OPTICAL ALIGNMENT	SIGHT (COAS) APERTURE
LEAD ANALYST:	L. GRAHAM, S. SINCLAIR	
ASSESSMENT:		
CRITICAL: FLIGH		S CIL ITEM
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SUBSYSTEM: MDAC ID: ITEM: LENS ASSEMBLY	CREW EQUIPMENT 6510 CREWMAN OPTICE	r Al Alignment Sight	(COAS) COMBINER
LEAD ANALYST:	L. GRAHAM, S.	SINCLAIR	
ASSESSMENT:			
CRITICAI FLIGH HDW/FU	T	DANCY SCREENS B C	CIL ITEM
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SUBSYSTEM: MDAC ID: ITEM:	CREW EQU 11215 EMU LIGH			- BAT	PTER'	Y CELL		
LEAD ANALYST:	H. SAXON							
ASSESSMENT:								
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SUBSYSTEM: MDAC ID: ITEM:	CREW EQUIPMENT 11219 EMU LIGHT ASSEM	BLY - LIGHT SWITCH	
LEAD ANALYST:	H. SAXON		
ASSESSMENT:			
CRITICALI FLIGHT HDW/FUN	<u>. </u>	NCY SCREENS B C	CIL ITEM
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RECOMMENDATIONS:	(If different	from NASA)	•
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REMARKS:																_	•		•	

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SUBSYSTEM: MDAC ID: ITEM:	CREW EQUIP 11222 EMU LIGHT		- ELECTRI	CAL CONNE	CTOR
LEAD ANALYST:	H. SAXON				
ASSESSMENT:					
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REMARKS:					

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LEAD ANALYST:	s.K. SI	NCLAIR								
ASSESSMENT:										
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REMARKS: THIS IS A NEW ITEM ADDED TO THE IOA DATA BASE DURING THE ASSESSMENT PROCESS. IOA CRITICALITY IS MATCHED TO THE NASA IVA										

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SUBSYSTE MDAC ID: ITEM:			CREW 13808 SNAT	3			BLY	ноок	LATCH			
LEAD ANA	LYST	:	s.K.	SINC	LAIR							
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NASA FMEA #:	SNATCH	BLOCK	2B	NEV	1 [X]
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ASSESSMENT:					
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SUBSYSTEM MDAC ID:	4:		CREW I 15182 MANUAI			F VA	LVE (1	MV3)			
LEAD ANAI	LYST:		B. RIC	CHARI)						
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SUBSYSTEM: CREW EQUIPMENT	
MDAC ID: 15184 ITEM: HOT WATER TANK O-RING	
LEAD ANALYST: B. RICHARD	
ASSESSMENT:	
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COMPARE [/] [N] [N] [N] []
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SUBSYSTEM: MDAC ID: ITEM:	CREW EQUIPMENT 15186 REHYDRATION PUMP	(P2)	
LEAD ANALYST:	B. RICHARD		
ASSESSMENT:			
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SUBSYSTEM: MDAC ID: ITEM:	CREW EQUIPME 15188 RHS COLD WAT	ENT PER RECIRCULA	TION VALVE	(SV2)
LEAD ANALYST:	B. RICHARD			
ASSESSMENT:				
CRITICAL FLIGH		INDANCY SCREE	ens	CIL ITEM
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* CIL RETENTION	RATIONALE: (1	f applicable	ADEQUATE	[]
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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:		89X	nasa d Basel	
SUBSYSTEM: MDAC ID: ITEM:	CREW EQUIP 15189 RHS OUTLET		VALVE (SV3)	
LEAD ANALYST:	B. RICHARD)		
ASSESSMENT:				
CRITICAL FLIGH	T	DUNDANCY B	SCREENS C	CIL ITEM
HDW/FU	INC A	Б	C	
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* CIL RETENTION	RATIONALE:	(If appli	cable) ADEQUA INADEQUA	

ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	12/10/87 CRWEQP-15190X 1.9.3	NASA DAT BASELIN NE	
SUBSYSTEM: MDAC ID: ITEM:	CREW EQUIPMENT 15190 RHS CHILLED WATER	R FEED SOLENOID VA	LVE (SV4)
LEAD ANALYST:	B. RICHARD		
ASSESSMENT:			
CRITICAL: FLIGHT HDW/FUI	r	CY SCREENS B C	CIL ITEM
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RECOMMENDATIONS:	(If different i	from NASA)	
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SUBSYSTI MDAC ID ITEM:				CREW 1519 CHEC	3				L										
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ASSESSM	ENT	:																	
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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	12/10/87 CRWEQP-15196X 1.12.2	NASA DATA: BASELINE [] NEW [X]
SUBSYSTEM: MDAC ID: ITEM:	CREW EQUIPMENT 15196 MICROBIAL CHECK VALVE S	SEAL
LEAD ANALYST:	B. RICHARD	
ASSESSMENT:		
CRITICALI FLIGHT HDW/FUN		CENS CIL ITEM
NASA [3 /2R IOA [3 /2R] [] []] [P] [P]	[]
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SUBSYSTEM: MDAC ID: ITEM:	CREW EQUIP 15197 LINES AND		(SEALS)			
LEAD ANALYST:	B. RICHARD					
ASSESSMENT:						
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LEAD ANA	LYST	:	B. RI	CHAR	D									
ASSESSMENT:														
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LEAD ANA	LYS	T:	B. RI	CHAR	D							
ASSESSME	NT:											
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LEAD AND	ALYSI	r:	s.K.	SINC	LAIR									
ASSESSME	ENT:													
CRITICALITY REDUNDANCY SCREENS FLIGHT														
	FLIGHT HDW/FUNC A B C													
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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	CRWEQP-	15329X		NASA DATA BASELINE NEW	
SUBSYSTEM: MDAC ID: ITEM:	CREW EQU 15329 SOLENOI		- OWDA		
LEAD ANALYST:	s.K. si	NCLAIR			
ASSESSMENT:					
CRITICAL: FLIGH		REDUNDA	ANCY SCREE	ens	CIL ITEM
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* CIL RETENTION	RATIONAL	E: (If a	applicable	ADEQUATE	•
REMARKS: NEW ITEM ADDED TO DISAGREE, HOWEVER WILL BE DISCUSSED	R, WITH	NASA ASS	SIGNED CRI	SSESSMENT PR	OCESS.

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SUBSYSTE MDAC ID:			1533				DISP	PENSEI	R PRESSU	RE RI	EGUL#	ATOR			
LEAD ANA	LYSI	:	s.K.	SINC	LAIR										
ASSESSME	ASSESSMENT:														
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SUBSYSTEM MDAC ID: ITEM:			CREW 1 15331 BYPAS											
LEAD ANA	LYST	:	s.K.	SIN	CI	AIR								
ASSESSME	NT:													
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THE WORST CASE OF A LEAK CAUSING THE OWDA TO BECOME INOPERABLE.

ASSESSME ASSESSME NASA FME	NT	II):	C	2/03 RWEQ WDA-	P-	15	332	x						ASA DA' BASELI N	NE]	
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REMARKS:	X Di	ישר	D 100		.03 1	.	72	D3.0		~**					Koult	•	L		J	

NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS. NASA FMEA DOES NOT TAKE LEAK TO WORST CASE CONDITION OF INADEQUATE WATER FLOW REACHING THE REHYDRATION NEEDLE. LACK OF WATER FOR REHYDRATION WILL RENDER OWDA INOPERABLE AND IF ALL REDUNDANCY IS LOST, WILL RESULT IN MISSION TERMINATION.

ASSESSME ASSESSME NASA FME	NT ID):		QP-	153	333X						ASA DA BASEL:		[x]	
SUBSYSTE MDAC ID:			CREW 1533: HOSE	3			•										
LEAD ANA	LYST:		s.K.	SI	NCI	LAIR											
ASSESSME	NT:																
		CALI	r		RI A	EDUND		Y B	SCF	REENS	S C			CI	L EM	1	
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COMPARE	[/]		[]		[]	[]			ĺ]	
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LEAD ANA	LYSI	r:	s.ĸ	. SINC	LAIR	1						
ASSESSME	ENT:											
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SUBSYSTE MDAC ID:	M:			15	5337			PMENT		гсн											
LEAD ANA	LYS	ST:	:	s.	к. я	SII	NC1	LAIR													
ASSESSME	NT:	;																			
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NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS.

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SUBSYSTEM: MDAC ID: ITEM:		CREW E 15338 OWDA -	-		ІТСН						
LEAD ANALY	ST:	s.K. s	INC	LAIR							
ASSESSMENT	:										
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LEAD ANA	LYS	T:	s.K.	SIN	CLAIF	₹							
ASSESSME	NT:												
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ASSESSMENT DASSESSMENT III NASA FMEA #:	D: CRWEQP-	16409X		NASA DAT BASELIN NI						
SUBSYSTEM: MDAC ID: ITEM:	16409	READMILL QUICK DISCONNECT								
LEAD ANALYST	: S.K. SI	NCLAIR								
ASSESSMENT:										
	ICALITY LIGHT	REDUNDA	ANCY SCR	EENS	CIL ITEM					
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COMPARE [N	/ 1 []	[]	[]	[]					
RECOMMENDATIO	ONS: (If d	ifferent	from N	ASA)						
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* CIL RETENT	ION RATIONALI	E: (If a	applicab	le) ADEQUATE INADEQUATE						
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	SSMENT DATE: 12/10/87 SSMENT ID: CRWEQP-16410X FMEA #: TREADMILL 8A								NASA DATA: BASELINE [] NEW [X]							
SUBSYSTE MDAC ID:				1641	W EQUI 10 ADMILL			BATT	ERIES	;						
LEAD ANA	LYS	ST	:	s.K	. SINC	LAIF	₹									
ASSESSME	NT	:														
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REMARKS:										,		,				

NEW ITEM ADDED TO IOA DATA BASE DURING ASSESSMENT PROCESS.

ASSESSM	MENT DATE: 1/11/88 MENT ID: CRWEQP-16512X MEA #: 07-1-725101-2									NASA DATA: BASELINE [] NEW [X]									
SUBSYSTI MDAC ID ITEM: ADJUSTM	•			16 CF	512 REWM/			PMEN' PTIC		AL	IGN	MEN	T	S:	IGHT	r (co	AS)		
LEAD AN	ALY	ST	:	н.	SA	KOI	N												
ASSESSM	ENT	:																	
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REMARKS	:																		

ASSESSM ASSESSM NASA FM	ENT I	D:	CRWE)P-16				NASA DATA: BASELINE [] NEW [X]						
SUBSYST MDAC ID ITEM: ASSEMBL	:		CREW 16513 CREWN	3			LIGNM	ENT S	SIGHT (COAS)	AFT	MOUNT		
LEAD AN	ALYST	:	H. S	NOX										
ASSESSM	ENT:													
		ICAL LIGH W/FU	T	F	REDUNI		SCR	EENS	2	CII				
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ASSESSMENT DATE: ASSESSMENT ID: NASA FMEA #:	1/12/88 CRWEQP-16514X 07-1-725103-4	NASA DATA: BASELINE [] NEW [X]						
SUBSYSTEM: MDAC ID: ITEM: ASSEMBLY	CREW EQUIPMENT 16514 CREWMAN OPTICA		T (COAS) AFT MOUNT					
LEAD ANALYST:	H. SAXON		,					
ASSESSMENT:								
CRITICALI FLIGHT HDW/FUN	ŗ	DANCY SCREENS B C	CIL ITEM					
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SUBSYSTI MDAC ID ITEM: ASSEMBLY	•		1651				JGNM	ENT S	SIGHT (COAS)	AFT	M OUNT
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SUBSYSTI MDAC ID ITEM: BRACKET	•			16	517	-		MENT TICA	L A	ALI	[GN	MENT	's	IGHT	' (co	AS)	AF'	T
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APPENDIX D

POTENTIAL CRITICAL ITEMS

APPENDIX D POTENTIAL CRITICAL ITEMS

NASA FMEA	MDAC-ID	FLIGHT	ITEM	FAILURE MODE
07-1B-SW1-1	2101	1/1	EVA SLIDEWIRE ASSEMBLY-SLIDE	STRUCTURAL FAILURE
07-1B-SW3-1	2103	2/2	EVA SLIDEWIRE ASSEMBLY-STOP	BREAKS FREE
07-1B-SW6-1	2104	2/1R	EVA SLIDEWIRE- END FITTINGS	STRUCTURAL FAILURE
07-1B-SW6-1	2105	2/1R	EVA SLIDEWIRE ASMBLY-COTTR PIN	STRUCTURAL FAILURE
07-1B-SW5-1	2107	2/1R	EVA SLIDEWIRE ASSEMBLY - QD PIN	FAILS TO OPEN
07-1B-SW5-1	2108	2/1R	EVA SLIDEWIRE ASSEMBLY-SUPPORT	STRUCTURAL FAILURE
07-1B-SW1-1	2109	1/1	EVA SLIDEWIRE	STRUCTURAL FAILURE
JSC17067B-1A	2200	1/1	ERCM TETHER- SMALL HOOK	STRUCTURAL FAILURE
JSC170671B-1A	2203	1/1	ERCM TETHER-CABLE	STRUCTURAL FAILURE
JSC17067B-1A	2204	1/1	ERCM SAFETY TETHER- CABLE ATTACH POINTS	STRUCTURAL FAILURE
JSC17067-1A	2205	1/1	ERCM TETHER- REEL CASE	STRUCTURAL FAILURE
JSC17067B-1A	2212	1/1	ERCM SAFETY TETHER-"D" RING	STRUCTURAL FAILURE
JSC17067B-2A	2300	1/1	WAIST TETHER-HOOKS	STRUCTURAL FAILURE
JSC17067B-2A	2303	1/1	WAIST TETHER-HOOKS	INADVERTENT OPENING
JSC17067B-2A	2304	1/1	WAIST TETHER-NOMEX WEBBING	STRUCTURAL FAILURE
JSC17067B-2A	2305	1/1	WAIST TETHER-NOMEX WEBBING	FAILS TO TEARAWAY AS DESIGNED
JSC17067B-2A	2306	1/1	WAIST TETHER-NOMEX WEBBING	TEARS AT ATTACH POINTS
TUBE CUTTER 6G		2/1R	TUBE CUTTER CUTTING WHEEL	STRUCTURAL FAILURE
TUBE CUTTER 61	3101	2/1R ⁻	TUBE CUTTER CUTTING WHEEL	PHYSICAL BINDING/ JAMMING
TUBE CUTTER 6A		•	TUBE CUTTER CUTTING WHEEL SLIDE	PHYSICAL BINDING/ JAMMING
TUBE CUTTER 6F		2/1R	TUBE CUTTER RATCHET WHEEL	PHYSICAL BINDING/ JAMMING
TUBE CUTTER 6D		2/1R	TUBE CUTTER SMALL RATCHET ASMB	FAILS TO OPEN/CLOS
TUBE CUTTER 6D		2/1R	TUBE CUTTER SMALL RATCHET ASMB	FAILS TO REMAIN OPEN/CLOSE
TUBE CUTTER 6C		3/1R	TUBE CUTTER PAWL	FAILS TO ENGAGE NOTCHES
TUBE CUTTER 6J	3107	3/1R	TUBE CUTTER PAWL	STRUCTURAL FAILURE

NASA FMEA	MDAC-ID	FLIGHT	ITEM	FAILURE MODE
TUBE CUTTER 6L	3109	2/1R	TUBE CUTTER ROLLER LINK	FAILS TO OPEN
TUBE CUTTER 6B	3111	2/1R	TUBE CUTTER LRG RATCHET HANDLE	STRUCTURAL FAILURE
TUBE CUTTER 6B	3112	2/1R	TUBE CUTTER SML RATCHET HANDLE	STRUCTURAL FAILURE
CENTERLINE LATC	3203	1/1	CNTRL LATCH BYPASS TOOL LATCH	FAILS TO REMAIN OPEN
CENTERLINE LATC		1/1	CNTRL LATCH BYPASS TOOL WHEEL	PHYSICAL BINDING/ JAMMING
CENTERLINE LATC		1/1	CNTRL LATCH BYPASS RATCHET HND	STRUCTURAL FAILURE
3-POINT LATCH 5		1/1	3-POINT LATCH TOOL RTCHT HANDL	STRUCTURAL FAILURE
	3301	1/1	3-POINT LATCH TOOL HOOK	STRUCTURAL FAILURE
3-POINT LATCH 5		1/1	3-POINT LATCH TOOL RTCHT WHEEL	PHYSICAL BINDING/ JAMMING STRUCTURAL FAILURE
CENTERLINE LATC		1/1	3-POINT LATCH TOOL RICHT WHEEL	PHYSICAL BINDING/
CENTERLINE LATC		1/1	3-POINT LATCH TOOL RATCHET WHEEL 3-POINT LATCH	JAMMING STRUCTURAL FAILURE
CENTERLINE LATC		1/1	TOOL ROLLER SHOE 3-POINT LATCH TOOL	
3-POINT LATCH 5		1/1	COMPENSATOR 3-POINT LATCH TOOL	
3-POINT LATCH 5	3308 3400	1/1 2/1R	ROLLER SHOE EVA WINCH AND MOUNT	OPEN STRUCTURAL FAILURE
EVA WINCH 3A EVA WINCH 3G	3400	2/1R 2/1R	ASMBLY HOOK EVA WINCH AND MOUNT	STRUCTURAL FAILURE
EVA WINCH 3F	3401	2/1R 2/1R	ASMBLY RTCHT	PHYSICAL BINDING/
EVA WINCH 3F	3402	2/1R 2/1R	ASMBLY RICHT EVA WINCH AND MNT	JAMMING STRUCTURAL FAILURE
EVA WINCH 3F	3404	2/1R 2/1R	ASM LRG CON HND EVA WINCH AND MNT	PHYSICAL BINDING/
EVA WINCH 3E	3405	2/1R	ASM LRG CON HND EVA WINCH AND MNT	JAMMING STRUCTURAL FAILURE
EVA WINCH 3C	3406	2/1R	RATCHET HANDLE EVA WINCH AND MNT	PHYSICAL BINDING/
EVA WINCH 3B	3407	2/1R	ASMBLY ROPE EVA WINCH AND	JAMMING STRUCTURAL FAILURE
EVA WINCH 3F	3409	2/1R	MOUNT ASMBLY ROPE EVA WINCH AND MNT	PHYSICAL BINDING/
	3413	2/1R	ASM RTCHT WHEEL EVA WINCH AND MNT	JAMMING STRUCTURAL FAILURE
	3413	2/ IK	ASM MNTG PLATE	PIROCIONAL PAIDONE

NASA FMEA	MDAC-ID	FLIGHT	ITEM	FAILURE MODE
EVA WINCH 3H	3414	2/1R	EVA WINCH AND MNT ASM GEARS	STRUCTURAL FAILURE
EVA WINCH 2D	3415	2/1R		PHYSICAL BINDING/ JAMMING
EVA WINCH 30	3416	2/1R	EVA WINCH AND MNT ASM PIP PIN	FAILS TO REMAIN ATTACHED
EVA WINCH 3C	3417	2/1R		PHYSICAL BINDING/ JAMMING
WINCH ADAPTER 1	3500	2/1R		STRUCTURAL FAILURE
WINCH ADAPTER 1	3501	2/1R	ASM ROPE	PHYSICAL BINDING/ JAMMING
WINCH ADAPTER 1	3502		EVA WINCH ADAPTER ASM HOOK	STRUCTURAL FAILURE
WINCH ADAPTER 1	3504	2/1R	EVA WINCH ADAPTER ASM ROPE CAM	STRUCTURAL FAILURE
WINCH ADAPTER 1	3505	2/1R	EVA WINCH ADAPTER ASM ROPE CAM	PHYSICAL BINDING/ JAMMING
WINCH ADAPTER 1	3506		EVA WINCH ADAPTER ASM ROPE PLT	STRUCTURAL FAILURE
WINCH ADAPTER 1	3509	2/1R	EVA WINCH ADAPTER ASM ROPE SPL	PHYSICAL BINDING/ JAMMING
PRD-5B	3600	2/1R	PRD ASM RATCHET HANDLE	
PRD-2	3601 3602	1/1 2/1P	PRD ASM HOOK PRD ASM HOOK LATCH PRD ASM HOOK LATCH	STRUCTURAL FAILURE STRUCTURAL FAILURE
PRD-3A	3603	2/1R	PRD ASM HOOK LATCH	FAILS TO CLOSE
PRD-5A	3604	1/1	PRD ASM RATCHET	PHYSICAL BINDING/
PRD-5A	3605	1/1	GEAR PRD ASM RATCHET	JAMMING STRUCTURAL FAILURE
		·	GEAR	
PRD-1A	3606	1/1	PRD ASM KEVLAR WEB STRAP	STRUCTURAL FAILURE
PRD-5A	3608	1/1	PRD ASM RATCHET SHAFT PIN	STRUCTURAL FAILURE
PRD-5A	3612	•	PRD ASM RATCHET LATCH	
PRD-5A	3613	1/1	PRD ASM RATCHET LATCH	RATCHET WHEEL
PRD-5A	3614	1/1	PRD ASM RATCHET ASM RELEASE	FAILS TO CLOSE
PRD-5B	3615	1/1	PRD ASM RATCHET ASM RELEASE	PHYSICAL BINDING/ JAMMING
PRD-2	3616	1/1	PRD ASM HOOK/WEB CONNECT PIN	STRUCTURAL FAILURE
SNATCH BLOCK 2C	3800	2/1R	SNATCH BLOCK ASM HOOK LATCH	FAILS TO OPEN
SNATCH BLOCK 2F	3801	2/1R	SNATCH BLOCK ASM HOOK SWIVEL	PHYSICAL BINDING/ JAMMING

NASA FMEA	MDAC-ID	FLIGHT	ITEM	FAILURE MODE
				DATE MO DEMAIN
SNATCH BLOCK 2G	3805	2/1R	SNATCH BLOCK ASM HOOK ASM LATCH BLK	FAILS TO REMAIN CLOSED
SNATCH BLOCK 2A	3807	2/1R	SNATCH BLOCK ASSEMBLY HOOK	STRUCTURAL FAILURE
JSC22453-2A	11216	1/1	EMU LIGHT ASSEMBLY	RAPID VENT/EXPLOSION
TUBE CUTTER 6H	13113	2/1R	TUBE CUTTER PAWL	PHYSICAL BINDING/ JAMMING
PRD-6	13620	1/1	PAYLOAD RETENTION DEVICE HOUSING	STRUCTURAL FAILURE
07-1-725103-4	16514	2/1R	CREWMAN OPTICAL ALIGNMENT	SEAT FAILS TO ADJUST UP/DOWN
07-1-725103-7	16517	2/1R	CREWMAN OPTICAL ALIGNMENT	SEAT FAILS TO ADJUST BACK/FORWARD

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APPENDIX E DETAILED ANALYSIS

This appendix contains the IOA analysis worksheets supplementing previous results reported in STSEOS Working Paper 1.0-WP-VA87001-01, Analysis of the Crew Equipment Subsystem, (02 November 1987). Prior results were obtained independently and documented before starting the FMEA/CIL assessment activity. Supplemental analysis was performed to address failure modes not previously considered by the IOA. Each sheet identifies the hardware item being analyzed, parent assembly and function performed. For each failure mode possible causes are identified, and hardware and functional criticality for each mission phase are determined as described in NSTS 22206. Instructions for Preparation of FMEA and CIL. Failure mode effects are described at the bottom of each sheet and worst case criticality is identified at the top.

LEGEND FOR IOA ANALYSIS WORKSHEETS

Hardware Criticalities:

- = Loss of life or vehicle
- = Loss of mission or next failure of any redundant item (like or unlike) could cause loss of life/vehicle
- = All others

Functional Criticalities:

- 1R = Redundant hardware items (like or unlike) all of which, if failed, could cause loss of life or vehicle.
- 2R = Redundant hardware items (like or unlike) all of which, if failed, could cause loss of mission.

Redundancy Screen A:

- 1 = Is Checked Out PreFlight
 2 = Is Capable of Check Out PreFlight
- = Not Capable of Check Out PreFlight 3
- NA = Not Applicable

Redundancy Screens B and C:

- P = Passed Screen
- F = Failed Screen
- NA = Not Applicable

DATE: 12/11/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: CREW EQUIPMENT FLIGHT: 3/3 MDAC ID: 11215 ABORT: /NA

EMU LIGHT ASSEMBLY - BATTERY CELL ITEM:

FAILURE MODE: TOXIC VENTING

LEAD ANALYST: H. SAXON SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) EMU LIGHT ASSEMBLY
- 3) BATTERY CELL
- 4)
- 5)
- 6)
- 7) 8)
- 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	/NA	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	3/3	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING	: /NA		·

REDUNDANCY SCREENS: A [] B [] C []

LOCATION: PAYLOAD BAY PART NUMBER: 10161-20072-01

CAUSES: VIBRATION, ELECTRICAL SHORT

EFFECTS/RATIONALE:

AN ELECTRICAL SHORT MAY CAUSE THE ELECTROLYTE TO VENT TOXIC GASES. THE BATTERIES ARE INSPECTED AFTER EVERY FLIGHT. ONCE A BATTERY HAS BEEN USED, IT IS REPLACED WITH A NEW ONE.

DATE: 12/11/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: CREW EQUIPMENT FLIGHT: 1/1 MDAC ID: 11216 ABORT: /NA

ITEM: EMU LIGHT ASSEMBLY - BATTERY CELL

FAILURE MODE: RAPID VENTING/EXPLOSION

LEAD ANALYST: H. SAXON SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) EMU LIGHT ASSEMBLY
- 3) BATTERY CELL
- 4)
- 5)
- 6)
- 7)
- 8) 9)

CRITICALITIES

	V-1		
FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	/NA	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	1/1	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING	: /NA		

REDUNDANCY SCREENS: A [] B [] C []

LOCATION: PAYLOAD BAY
PART NUMBER: 10161-20072-01

CAUSES: INTERNAL SHORT

EFFECTS/RATIONALE:

AN INTERNAL SHORT MAY CAUSE RAPID VENTING OF TOXIC GASES OR EXPLOSION. PAST EXPERIENCE AND ACCEPTANCE TESTING SHOW NO FAILURES HAVE OCCURRED.

DATE: 12/11/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: CREW EQUIPMENT FLIGHT: 3/3 /NA 11217 ABORT: MDAC ID: EMU LIGHT ASSEMBLY - THERMOSTAT ITEM: FAILURE MODE: FAILS TO OPEN LEAD ANALYST: H. SAXON SUBSYS LEAD: S.K. SINCLAIR BREAKDOWN HIERARCHY: 1) CREW EQUIPMENT 2) EMU LIGHT ASSEMBLY 3) THERMOSTAT 4) 5) 6) 7) 8)

CRITTCALITTES

	CKITICM	CKITICADTITES		
FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC	
PRELAUNCH:	/NA	RTLS:	/NA	
LIFTOFF:	/NA	TAL:	/NA	
ONORBIT:	3/3	AOA:	/NA	
DEORBIT:	/NA	ATO:	/NA	
LANDING/SAFIN	G: /NA		<i>₹</i>	

REDUNDANCY SCREENS: A [] B [] C []

LOCATION: PAYLOAD BAY PART NUMBER: 10161-20064-01

CAUSES: CONTAMINATION, MISHANDLING/ABUSE, VIBRATION

EFFECTS/RATIONALE:

FAILURE OF THE THERMOSTAT COULD ALLOW THE BATTERIES TO BECOME TOO HOT. THE BATTERIES COULD VENT TOXIC GAS OR EXPLODE.

REFERENCES:

9)

DATE: 12/11/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: CREW EQUIPMENT FLIGHT: 3/2R MDAC ID: 11218 ABORT: /NA

ITEM: EMU LIGHT ASSEMBLY - THERMOSTAT

FAILURE MODE: FAILS TO CLOSE

LEAD ANALYST: H. SAXON SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) EMU LIGHT ASSEMBLY
- 3) THERMOSTAT
- 4)
- 5)
- 6)
- 7) 8)
- 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	/NA	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	3/2R	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING	: /NA		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PAYLOAD BAY
PART NUMBER: 10161-20064-01

CAUSES: CONTAMINATION, MISHANDLING/ABUSE, VIBRATION

EFFECTS/RATIONALE:

FAILURE OF THE THERMOSTAT COULD ALLOW THE BATTERIES TO BECOME TOO HOT. THE BATTERIES COULD VENT TOXIC GAS OR EXPLODE.

DATE: 12/11/87

SUBSYSTEM: CREW EQUIPMENT

HIGHEST CRITICALITY HDW/FUNC

MDAC ID: 11219 FLIGHT: ABORT:

3/2R /NA

ITEM:

EMU LIGHT ASSEMBLY - LIGHT SWITCH

FAILURE MODE: STICKS ON IN TWO BULB MODE

LEAD ANALYST: H. SAXON

SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- EMU LIGHT ASSEMBLY
- 3) LIGHT SWITCH

4)

5)

6)

7) 8)

9)

CRITICALITIES

FLIGHT PHASE PRELAUNCH: LIFTOFF: ONORBIT:	HDW/FUNC	ABORT	HDW/FUNC
	/NA	RTLS:	/NA
	/NA	TAL:	/NA
	3/2R	AOA:	/NA
DEORBIT: LANDING/SAFING:	/NA	ATO:	/NA /NA

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PAYLOAD BAY

PART NUMBER: 10161-20064-01

CAUSES:

EFFECTS/RATIONALE:

THE BATTERIES WOULD BE DISCHARGED FASTER THAN PLANNED.

DATE: 12/11/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: CREW EQUIPMENT FLIGHT: 3/2R MDAC ID: 11220 ABORT: /NA

ITEM: EMU LIGHT ASSEMBLY - LIGHT SWITCH

FAILURE MODE: STICKS IN OFF POSITION

LEAD ANALYST: H. SAXON SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) EMU LIGHT ASSEMBLY
- 3) LIGHT SWITCH
- 4)
- 5)
- 6)
- 7) 8)
- 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	/NA	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	3/2R	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING	: /NA		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PAYLOAD BAY
PART NUMBER: 10161-20064-01

CAUSES:

EFFECTS/RATIONALE:

LOSS OF A LIGHT COULD MAKE PERFORMANCE OF TASKS MORE DIFFICULT. OTHER LIGHTS ARE AVAILABLE.

DATE:

12/11/87

HIGHEST CRITICALITY HDW/FUNC

MDAC ID: 11221

SUBSYSTEM: CREW EQUIPMENT

FLIGHT: ABORT:

3/2R /NA

ITEM:

EMU LIGHT ASSEMBLY - FINGER CONTACT ASSEMBLY

FAILURE MODE: LOSS OF BATTERY POWER TO CIRCUIT

LEAD ANALYST: H. SAXON SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) EMU LIGHT ASSEMBLY
- 3) FINGER CONTACT ASSEMBLY

4)

5)

6)

7)

8)

9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	/NA	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	3/2R .	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING	: /NA		•

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PAYLOAD BAY

PART NUMBER: 10161-20041-02

CAUSES:

EFFECTS/RATIONALE:

LOSS OF POWER TO THE SEQUENCING CIRCUIT MEANS LOSS OF LIGHT ASSEMBLY FUNCTION. EXTRA LIGHT ASSEMBLY IS AVAILABLE.

DATE:

12/11/87

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: CREW EQUIPMENT

FLIGHT:

3/2R

MDAC ID:

11222

ABORT:

/NA

ITEM:

EMU LIGHT ASSEMBLY - ELECTRICAL CONNECTOR

FAILURE MODE: LOSS OF POWER TO SEQUENCING CIRCUIT

LEAD ANALYST: H. SAXON

SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) EMU LIGHT ASSEMBLY
- 3) ELECTRICAL CONNECTOR

4)

5)

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	/NA	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	3/2R	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING	· /NA		

LANDING/SAFING: /NA

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION:

PAYLOAD BAY

PART NUMBER: ST20C1080-02

CAUSES:

EFFECTS/RATIONALE:

LOSS OF POWER TO THE SEQUENCING CIRCUIT MEANS LOSS OF LIGHT ASSEMBLY FUNCTION. EXTRA LIGHT ASSEMBLY IS AVAILABLE.

12/14/87 HIGHEST CRITICALITY HDW/FUNC DATE:

SUBSYSTEM: CREW EQUIPMENT FLIGHT: 3/2R MDAC ID: 11325 ABORT: /NA

OBS - SIGNAL CONDITIONER - BATTERY CONTACT ITEM:

ASSEMBLY

FAILURE MODE: LOSS OF OUTPUT

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) OPERATIONAL BIOINSTRUMENTATION SYSTEM
- 3) SIGNAL CONDITIONER
- 4) BATTERY CONTACT ASSEMBLY

5)

6)

7) 8)

9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	/NA	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	3/2R	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING	: /NA		·

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: CREW MODULE

PART NUMBER: TBD

CAUSES: CONTAMINATION, MECHANICAL SHOCK, PIECE-PART FAILURE, STRUCTURAL FAILURE, VIBRATION

EFFECTS/RATIONALE:

LOSS OF THE BATTERY CONTACT ASSEMBLY WILL MEAN LOSS OF SIGNAL CONDITIONER POWER AND LOSS OF THE SIGNAL CONDITIONER. THE SIGNAL CONDITIONER FROM THE SECOND OBS CAN BE USED AS A REPLACEMENT ITEM BUT LOSS OF ALL REDUNDANCY DURING USE ON AN IVA CREWMEMBER CAN RESULT IN A LOSS OF MISSION.

12/14/87

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: CREW EQUIPMENT

FLIGHT: 3/2R

MDAC ID: 11326

ABORT:

/NA

ITEM:

OBS - SIGNAL CONDITIONER

FAILURE MODE: OPEN (ELECTRICAL), SHORTED

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) OPERATIONAL BIOINSTRUMENTATION SYSTEM
- 3) SIGNAL CONDITIONER
- 4)
- 5)
- 6)
- 7)
- 8)

9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	/NA	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	3/2R	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING	: /NA	•	

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: CREW MODULE

PART NUMBER: TBD

CAUSES: CONTAMINATION, MECHANICAL SHOCK, PIECE-PART FAILURE,

VIBRATION

EFFECTS/RATIONALE:

AN OPEN OR SHORT CIRCUIT WITHIN THE OBS SIGNAL CONDITIONER WILL MEAN THE LOSS OF THE SIGNAL CONDITIONER. LOSS OF ALL REDUNDANCY WHEN THE ITEM IS REQUIRED FOR USE BY AN IVA CREWMEMBER CAN RESULT IN A LOSS OF MISSION.

12/14/87

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: CREW EQUIPMENT

FLIGHT: 3/2R

MDAC ID: 11327

ABORT:

/NA

ITEM:

OBS - IVA CABLE

FAILURE MODE: OPEN (ELECTRICAL), SHORTED

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) OPERATIONAL BIOINSTRUMENTATION SYSTEM
- 3) IVA CABLE

4)

5)

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	/NA	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	3/2R	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING	: /NA	•	-

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: CREW MODULE

PART NUMBER: TBD

CAUSES: MECHANICAL SHOCK, PIECE-PART FAILURE, CONTAMINATION

EFFECTS/RATIONALE:

AN OPEN OR SHORTED CIRCUIT WITHIN THE IVA CABLE WILL RESULT IN A LOSS OF THE OBS. IF THE OBS IS REQUIRED FOR USE ON AN IVA CREWMEMBER, THE LOSS COULD RESULT IN A LOSS OF MISSION.

HIGHEST CRITICALITY HDW/FUNC 11/17/87 DATE:

FLIGHT: 3/2R SUBSYSTEM: CREW EQUIPMENT /NA ABORT: 11433 MDAC ID:

PORTABLE FOOT RESTRAINT ARTICULATING SOCKET ITEM:

ASSEMBLY QUICK RELEASE PIN

FAILURE MODE: CANNOT REMOVE PIN

LEAD ANALYST: H. SAXON SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- PORTABLE FOOT RESTRAINT
- 3) ARTICULATING SOCKET ASSEMBLY
- QUICK RELEASE PIN 4)
- 5)
- 6)
- 7)
- 8) 9)

CRITICALITIES

HDW/FUNC		ABORT	HDW/FUNC
/NA		RTLS:	/NA
/NA		TAL:	/NA
3/2R	•	AOA:	/NA
/NA		ATO:	/NA
/NA			
	/NA 3/2R /NA	/NA /NA 3/2R /NA	/NA RTLS: /NA TAL: 3/2R AOA: /NA ATO:

REDUNDANCY SCREENS: A [2] B [P] C [P]

PAYLOAD BAY LOCATION: PART NUMBER: 10159-10035

CAUSES: CONTAMINATION, MISHANDLING/ABUSE

EFFECTS/RATIONALE:

QUICK RELEASE PIN CANNOT BE REMOVED. PLATFORM ASSEMBLY CANNOT BE

DETACHED FROM ARTICULATING ASSEMBLY.

REFERENCES: JSC-20466, 10155-10035

DATE: 11/19/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: CREW EQUIPMENT FLIGHT: 3/3 MDAC ID: 12110 ABORT: /NA

ITEM: EVA SLIDEWIRE CUSHION FAILURE MODE: STRUCTURAL FAILURE

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) EVA SLIDEWIRE ASSEMBLY
- 3) DEPLOYMENT MECHANISM
- 4) CUSHION
- 5)
- 6)
- 7)
- 8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	/NA	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	3/3	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING	: /NA		•

REDUNDANCY SCREENS: A [] B [] C []

LOCATION: PAYLOAD BAY

PART NUMBER:

CAUSES:

EFFECTS/RATIONALE:

THE CUSHION FORMS A PAD BETWEEN THE END FITTING AND THE RADIATOR. IN THE ABSENCE OF ADDITIONAL DEFORMATION OF THE YOKE/DEPLOYMENT MECHANISM, THE FAILURE OF THE CUSHION WILL HAVE NO EFFECT.

HIGHEST CRITICALITY HDW/FUNC DATE: 11/18/87 FLIGHT: 3/3 SUBSYSTEM: CREW EQUIPMENT MDAC ID: 12214 ABORT: /NA ERCM SAFETY TETHER - CABLE THIMBLE ITEM: FAILURE MODE: STRUCTURAL FAILURE LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: S.K. SINCLAIR BREAKDOWN HIERARCHY: 1) CREW EQUIPMENT 2) ERCM SAFETY TETHER 3) CABLE THIMBLE 4) 5) 6) 7) 8) 9) CRITICALITIES

HDW/FUNC ABORT HDW/FUNC

FLIGHT PHASE RTLS: TAL: AOA: /NA PRELAUNCH: /NA /NA LIFTOFF: /NA /NA ONORBIT: 3/3 LANDING/SAFING: /NA ATO: /NA

/NA

REDUNDANCY SCREENS: A [] B [] C []

LOCATION: PAYLOAD BAY

PART NUMBER:

CAUSES: MECHANICAL SHOCK, MISHANDLING/ABUSE

EFFECTS/RATIONALE:

NO EFFECT ON CREW OR VEHICLE SAFETY.

REFERENCES: 10162-10062

DATE:

12/02/87

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: CREW EQUIPMENT

FLIGHT: 2/1R

MDAC ID: 13113

ABORT:

/NA

ITEM:

TUBE CUTTER PAWL

FAILURE MODE: PHYSICAL BINDING/JAMMING

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) TUBE CUTTER
- 3) PAWL
- 4)
- 5)
- 6)
- 7)
- 8)

9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	/NA	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	2/1R	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING	G: /NA		•

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: PAYLOAD BAY

PART NUMBER: SED33101368

CAUSES: CONTAMINATION, PIECE-PART FAILURE

EFFECTS/RATIONALE:

UNABLE TO COMPLETE CUTTING SEQUENCE. FAILURE RESULTS IN LOSS OF TOOL FUNCTION. USED TO CUT DRIVER TUBES ON PAYLOAD BAY DOOR. IF UNABLE TO CLOSE DOORS THE VEHICLE IS UNABLE TO DEORBIT. LOSS OF ALL REDUNDANCY WILL RESULT IN LOSS OF LIFE AND VEHICLE.

SUBSYSTEM: CREW EQUIPMENT
MDAC ID: 13300
HIGHEST CRITICALITY HDW/FUNC FLIGHT: 3/3 ABORT: /NA MDAC ID: 13309

SAFETY RELEASE ITEM: FAILURE MODE: FAILS TO RELEASE

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) 3-POINT LATCH TOOL
- 3) SAFETY RELEASE
- 4)
- 5)
- 6)
- 7)
- 8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	/NA	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	3/3	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING	: /NA		

REDUNDANCY SCREENS: A [] B [] C []

LOCATION: PAYLOAD BAY PART NUMBER: SED33101327

CAUSES: CONTAMINATION

EFFECTS/RATIONALE:

SAFETY RELEASE FAILS TO RELEASE. THE CREWMEMBER IS UNABLE TO (AUTOMATICALLY) SPRING THE TOOL OPEN TO GRAB THE LATCH. HOWEVER, THE CREWMEMBER CAN RATCHET THE TOOL UNTIL THE RELEASE MECHANISM BREAKS AND THE TOOL OPENS.

DATE:

12/02/87

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: CREW EQUIPMENT

FLIGHT: 3/3

MDAC ID: 13310

ABORT:

/NA

ITEM:

RELEASE SPRING

FAILURE MODE: STRUCTURAL FAILURE

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) 3-POINT LATCH TOOL
- 3) RELEASE SPRING

4)

5)

6)

7)

8)

9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	/NA	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	3/3	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING	: /NA		•

REDUNDANCY SCREENS: A [] B [] C []

LOCATION: PAYLOAD BAY

PART NUMBER: SED33101327

CAUSES: PIECE-PART FAILURE

EFFECTS/RATIONALE:

UNABLE TO SPRING TOOL OPEN TO GRAB LATCH. CREWMEMBER CAN RATCHET TOOL UNTIL CONTACT IS MADE WITH LATCH.

HIGHEST CRITICALITY HDW/FUNC 11/22/87 DATE:

FLIGHT: 3/3 SUBSYSTEM: CREW EQUIPMENT /NA MDAC ID: 13418 ABORT:

EVA WINCH AND MOUNT ASSEMBLY PIP PIN ITEM:

FAILURE MODE: CANNOT BE REMOVED

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) EVA WINCH AND MOUNT ASSEMBLY
- 3) PIP PIN
- 4)
- 5)
- 6)
- 7) 8)
- 9)

CRITICALITIES

HDW/FUNC ABORT HDW/FUNC

3/3 RTLS: /NA
/NA TAL: /NA
/NA AOA: /NA
/NA ATO: /NA FLIGHT PHASE PRELAUNCH: /NA /NA /NA LIFTOFF: ONORBIT: DEORBIT: LANDING/SAFING: 3/3

REDUNDANCY SCREENS: A [] B [] C []

LOCATION: PAYLOAD BAY PART NUMBER: SED331015170

CAUSES: CONTAMINATION, PIECE-PART FAILURE

EFFECTS/RATIONALE:

THE PIP PIN IS REMOVED ONLY DURING GROUND OPERATIONS AND HAS NO EFFECT ON ORBITAL OPERATIONS. IT IS BEING ADDED ONLY FOR COMPLETENESS AND AGREEMENT WITH NASA FMEAS.

DATE: 11/22/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: CREW EQUIPMENT FLIGHT: 3/3 MDAC ID: 13419 ABORT: /NA

ITEM: EVA WINCH AND MOUNT ASSEMBLY PIP PIN

FAILURE MODE: CANNOT BE INSERTED

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) EVA WINCH AND MOUNT ASSEMBLY
- 3) PIP PIN
- 4)
- 5)
- 6)
- 7)
- 8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	3/3	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	/NA	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING	: 3/3	•	•

REDUNDANCY SCREENS: A [] B [] C []

LOCATION: PAYLOAD BAY PART NUMBER: SED331015170

CAUSES: CONTAMINATION, PIECE-PART FAILURE

EFFECTS/RATIONALE:

PIP PIN IS INSERTED ONLY DURING GROUND TURNAROUND OPERATION. THIS FALIURE HAS NO EFFECT ON CREW OR FLIGHT OPERATIONS AND IS INCLUDED ONLY FOR COMPLETENESS IN COMPARISON WITH NASA FMEAS.

DATE: 11/22/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: CREW EQUIPMENT FLIGHT: 3/3 MDAC ID: 13420 ABORT: /NA

ITEM: EVA WINCH AND MOUNT ASSEMBLY HOOK

FAILURE MODE: HOOK JAMS CLOSED

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) EVA WINCH AND MOUNT ASSEMBLY
- 3) HOOK
- 4)
- 5)
- 6)
- 7)
- 8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	/NA	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	3/3	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING	: /NA		

REDUNDANCY SCREENS: A [] B [] C []

LOCATION: PAYLOAD BAY
PART NUMBER: SED331015170

CAUSES: CONTAMINATION, MATERIAL DEFORMATION

EFFECTS/RATIONALE:

UNABLE TO ATTACH HOOK. LATCH CAN BE BENT OUT OF THE WAY AND HOOK

SECURED WITH TAPE.

REFERENCES: JSC-12770, SFOM VOL 15, JSC-20466, SED33101570

DATE: 11/22/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: CREW EQUIPMENT FLIGHT: 3/3 MDAC ID: 13421 /NA ABORT:

ITEM: EVA WINCH AND MOUNT ASSEMBLY HOOK

FAILURE MODE: HOOK JAMS OPEN

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- EVA WINCH AND MOUNT ASSEMBLY 2)
- 3) HOOK
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	/NA	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	3/3	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING	: /NA		· •

REDUNDANCY SCREENS: A [] B [] C []

LOCATION: PAYLOAD BAY PART NUMBER: SED331015170

CAUSES: MATERIAL FAILURE

EFFECTS/RATIONALE:

UNABLE TO SECURE HOOK BY NORMAL METHODS. HOOK CAN BE SECURED WITH TAPE.

REFERENCES: JSC-12770, SFOM VOL 15, JSC-20466, SED33101570

HIGHEST CRITICALITY HDW/FUNC 11/22/87 DATE: SUBSYSTEM: CREW EQUIPMENT FLIGHT: 3/3

ABORT: /NA MDAC ID: 13422

EVA WINCH AND MOUNT ASSEMBLY INTERIOR COIL SPRING ITEM:

FAILURE MODE: STRUCTURAL FAILURE (BREAKS)

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) EVA WINCH AND MOUNT ASSEMBLY
- INTERIOR COIL SPRING 3)
- 4)
- 5)
- 6)
- 7) 8)
- 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC	
PRELAUNCH:	/NA	RTLS:	/NA	
LIFTOFF:	/NA	TAL:	/NA	
ONORBIT:	3/3	AOA:	/NA	
DEORBIT:	/NA	ATO:	/NA	
LANDING/SAFING	: /NA			

REDUNDANCY SCREENS: A [] B [] C []

LOCATION: PAYLOAD BAY PART NUMBER: SED331015170

CAUSES: PIECE-PART FAILURE

EFFECTS/RATIONALE:

UNABLE TO USE AUTOMATIC REEL IN FEATURE. CREW STILL ABLE TO REEL IN MANUALLY.

REFERENCES: JSC-12770, SFOM VOL 15, JSC-20466, SED33101570

DATE: 12/15/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: CREW EQUIPMENT FLIGHT: 1/1
ABORT: /NA MDAC ID: 13620 /NA

ITEM: PAYLOAD RETENTION DEVICE HOUSING ASSEMBLY

FAILURE MODE: STRUCTURAL FAILURE/FRACTURES

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) PAYLOAD RETENTION DEVICE
- 3) HOUSING ASSEMBLY
- 4)
- 5)
- 6)
- 7)
- 8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	/NA	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	3/3	AOA:	/NA
DEORBIT:	1/1	ATO:	/NA
LANDING/SAFING	: /NA		·

REDUNDANCY SCREENS: A [] B [] C []

LOCATION: PAYLOAD BAY PART NUMBER: 10163-10063-03

CAUSES: OVERLOAD, PIECE-PART FAILURE

EFFECTS/RATIONALE:

HOUSING ASSEMBLY BREAKS DURING ENTRY. THE RMS OR PAYLOAD COMES LOOSE IN THE PAYLOAD BAY WITH THE POSSIBILITY OF RESULTING DAMAGE TO THE VEHICLE AND POSSIBLE LOSS OF LIFE OF THE CREW.

REFERENCES: JSC-20466, 10163-10063

DATE:

12/15/87

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: CREW EQUIPMENT

FLIGHT:

3/1R

MDAC ID: 13621

ABORT:

/NA

ITEM:

PAYLOAD RETENTION DEVICE HOOK LATCH

FAILURE MODE: FAILS TO OPEN

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) PAYLOAD RETENTION DEVICE
- 3) HOOK LATCH
- 4)
- 5)
- 6)
- 7) 8)
- 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	/NA	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	3/1R	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING:	·/NA		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION:

PAYLOAD BAY

PART NUMBER: 10163-10063-03

CAUSES: CONTAMINATION, PIECE-PART FAILURE

EFFECTS/RATIONALE:

HOOK LATCH FAILING TO OPEN WILL MEAN LOSS OF TOOL FUNCTION. DEVICES ARE FLOWN ON EACH FLIGHT PLUS RMS/PAYLOAD JETTISON CAPABILITY STILL EXISTS. LOSS OF ALL REDUNDANCY, HOWEVER, CAN MEAN LOSS OF CREW AND VEHICLE.

REFERENCES: JSC-20466, 10163-10063

DATE: 11/22/87

SUBSYSTEM: CREW EQUIPMENT

HIGHEST CRITICALITY HDW/FUNC

FLIGHT: 3/3

MDAC ID: 13808

ABORT:

/NA

ITEM:

SNATCH BLOCK ASSEMBLY HOOK LATCH

FAILURE MODE: FAILS TO CLOSE, JAMS OPEN

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) SNATCH BLOCK ASSEMBLY
- HOOK LATCH 3)
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	/NA	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	3/3	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING	: /NA		•

REDUNDANCY SCREENS: A [] B [] C []

LOCATION: PAYLOAD BAY PART NUMBER: SED33102357

CAUSES: CONTAMINATION, MISHANDLING/ABUSE, PIECE-PART FAILURE

EFFECTS/RATIONALE:

THE HOOK LATCH FAILING OPEN WILL HAVE NO EFFECT ON CREW OPERATIONS OR SAFETY. HOOK CAN BE MANUALLY CLOSED OR SECURED WITH TAPE.

REFERENCES: JSC-20466, SED33012357

HIGHEST CRITICALITY HDW/FUNC 11/19/87 DATE: FLIGHT: 3/3 ABORT: /NA SUBSYSTEM: CREW EQUIPMENT

/NA MDAC ID: 13809

SNATCH BLOCK ASSEMBLY HOOK LATCH ITEM:

FAILURE MODE: FAILS OPEN

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) SNATCH BLOCK ASSEMBLY
- 3) HOOK LATCH
- 4)
- 5)
- 6) 7)
- 8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	/NA	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	3/3	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING	: /NA		

REDUNDANCY SCREENS: A [] B [] C []

LOCATION: PAYLOAD BAY PART NUMBER: SED33102357

CAUSES: CONTAMINATION, MISHANDLING/ABUSE

EFFECTS/RATIONALE:

HOOK LATCH JAMS OPEN AND THE CREW IS UNABLE TO SECURE THE TOOL. TAPE OR OTHER MEANS OF SECURING THE TOOL ARE STILL AVAILABLE OR THE CREW CAN MANUALLY CLOSE THE HOOK.

REFERENCES: JSC-20466, SED33012357

DATE: 12/02/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: CREW EQUIPMENT FLIGHT: 3/3 MDAC ID: 15182 ABORT: / ITEM: MANUAL SHUT OFF VALVE (MV3) FAILURE MODE: FAILS CLOSED LEAD ANALYST: B. RICHARD SUBSYS LEAD: S.K. SINCLAIR BREAKDOWN HIERARCHY: 1) CREW EQUIPMENT 2) GALLEY 3) WATER SUPPLY 4) MANUAL SHUT OFF VALVE (MV3) 5) 6) 7) 8) 9) CRITICALITIES FLIGHT PHASE HDW/FUNC ABORT HDW/FUNC / RTLS: PRELAUNCH: LIFTOFF: TAL: 3/3 AOA: ONORBIT: DEORBIT: ATO: LANDING/SAFING: REDUNDANCY SCREENS: A [] B [] C [] LOCATION: GALLEY PART NUMBER: MV3 CAUSES: CONTAMINATION, PIECE-PART FAILURE EFFECTS/RATIONALE: THIS VALVE SUPPLIES AMBIENT WATER TO THE HOT WATER LOOP OF THE GALLEY. IF IT FAILS CLOSED, THERE WILL BE NO HOT WATER FOR

REFERENCES: JSC 12770, SSSH 6.6, GALLEY UPGRADE MODIFICATIONS

REHYDRATION.

DATE: 12/02/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: CREW EQUIPMENT FLIGHT: 3/2R

MDAC ID: 15183 FIGHT: 5/2

ABORT: /

ITEM: MANUAL SHUT OFF VALVE (MV3)

FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: B. RICHARD SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) GALLEY
- 3) WATER SUPPLY
- 4) MANUAL SHUT OFF VALVE (MV3)
- 5) SEAL FAILURE

6)

7) 8)

9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC	
PRELAUNCH:	./	RTLS:	/	
LIFTOFF:	,	TAL:	/	
ONORBIT:	3/2R	AOA:	/	
DEORBIT:	· / ·	ATO:	/	
LANDING/SAFING	· /			

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: GALLEY
PART NUMBER: MV3

CAUSES: PIECE-PART FAILURE

EFFECTS/RATIONALE:

FAILURE OF THE SEAL WILL RESULT IN FREE WATER IN THE CABIN WHICH CAN BE A HAZARD TO OTHER SYSTEMS. THIS FAILURE WOULD HAVE LITTLE EFFECT ON THE OPERATION OF THE GALLEY AND COULD BE CONTROLLED IF DETECTED BY A CREWMAN.

DATE:

12/02/87

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: CREW EQUIPMENT

FLIGHT:

3/2R

MDAC ID: 15184

ABORT:

ITEM:

HOT WATER TANK O-RING

FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: B. RICHARD SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) GALLEY
- 3) HOT WATER SYSTEM
- 4) HOT WATER TANK
- 5) O-RING

6)

7)

8) 9)

CRITICALITIES

HDW/FUNC ABORT HDW/FUNC FLIGHT PHASE PRELAUNCH: RTLS: / LIFTOFF: TAL: 3/2R ONORBIT: AOA: DEORBIT: ATO: LANDING/SAFING: /

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: GALLEY

PART NUMBER:

CAUSES: PIECE-PART FAILURE

EFFECTS/RATIONALE:

FAILURE OF THE O-RING WOULD RESULT IN A SMALL AMOUNT OF FREE WATER IN THE CABIN WHICH COULD POSE A HAZARD TO OTHER SYSTEMS. IF CREWMEN CANNOT CONTROL THE LEAK, THE HOT WATER WOULD HAVE TO BE SHUT DOWN AND WOULD NOT BE AVAILABLE FOR THE REST OF THE MISSION.

DATE: 12/02/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: CREW EQUIPMENT FLIGHT: 3/2R MDAC ID: 15185 ABORT: /

ITEM: RECIRCULATION PUMP (P1) SEAL

FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: B. RICHARD SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) GALLEY
- 3) HOT WATER SYSTEM
- 4) RECIRCULATION PUMP (P1)
- 5) SEAL
- 6)
- 7)
- 8)
- 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	,	RTLS:	/
LIFTOFF:	,	TAL:	/
ONORBIT:	3/2R	AOA:	/
DEORBIT:	/	ATO:	/
LANDING/SAFING	: /		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: GALLEY PART NUMBER: P1

CAUSES: PIECE-PART FAILURE

EFFECTS/RATIONALE:

FAILURE OF THE SEAL COULD RESULT IN FREE WATER IN THE CABIN WHICH COULD POSE A HAZARD TO OTHER SYSTEMS. IF THE LEAK CANNOT BE CONTROLLED, THE HOT WATER WILL HAVE TO BE SHUT DOWN AND WOULD NOT BE AVAILABLE FOR THE REST OF THE MISSION.

DATE:

12/02/87

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: CREW EQUIPMENT

FLIGHT:

3/2R

MDAC ID: 15186

ABORT:

/

ITEM:

REHYDRATION PUMP (P2)

FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: B. RICHARD SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) GALLEY
- 3) REHYDRATION STATION PUMP
- 4) SEAL

5)

6)

7)

8) 9)

CRITICALITIES

HDW/FUNC ABORT HDW/FUNC RTLS: FLIGHT PHASE PRELAUNCH: TAL: LIFTOFF: 3/2R ONORBIT: AOA: LANDING/SAFING: / ATO:

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: GALLEY

PART NUMBER: P2

CAUSES: PIECE-PART FAILURE

EFFECTS/RATIONALE:

FAILURE OF THE SEAL WILL RESULT IN FREE WATER IN THE CABIN WHICH COULD POSE A HAZARD TO OTHER SYSTEMS. CREWMEN SHOULD BE ABLE TO CONTROL THE LEAK IF IT CAN BE DETECTED.

HIGHEST CRITICALITY HDW/FUNC 12/02/87 DATE: 3/2R FLIGHT:

SUBSYSTEM: CREW EQUIPMENT ABORT: MDAC ID: 15187

COLD WATER RECIRCULATION VALVE (SV1) ITEM:

FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: B. RICHARD SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- GALLEY 2)
- 3) RHS WATER SUPPLY
- 4) SOLENOID VALVE
- 5) SEAL
- 6)
- 7)
- 8) 9)

CRITICALITIES

HDW/FUNC ABORT HDW/FUNC
/ RTLS: /
TAL: /
3/2R AOA: / FLIGHT PHASE PRELAUNCH: LIFTOFF: ONORBIT: ATO: DEORBIT: LANDING/SAFING:

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: GALLEY PART NUMBER: SV1

CAUSES: PIECE-PART FAILURE

EFFECTS/RATIONALE:

THIS FAILURE WILL RESULT IN FREE WATER IN THE CABIN WHICH CAN POSE A HAZARD TO OTHER SYSTEMS. CREWMEN SHOULD BE ABLE TO CONTROL THE LEAK IF IT CAN BE DETECTED.

DATE:

12/02/87

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: CREW EQUIPMENT

FLIGHT:

3/2R

MDAC ID: 15188

ABORT:

ITEM:

RHS COLD WATER RECIRCULATION VALVE (SV2)

FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: B. RICHARD SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) GALLEY
- 3) WATER SUPPLY
- BYPASS SOLENOID VALVE 4)
- 5) SEAL
- 6)
- 7)
- 8)
- 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	/	RTLS:	,
LIFTOFF:	/	TAL:	,
ONORBIT:	3/2R	AOA:	,
DEORBIT:	/	ATO:	,
LANDING/SAFING:	: /		,

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: GALLEY

PART NUMBER: SV2

CAUSES: PIECE-PART FAILURE

EFFECTS/RATIONALE:

THIS FAILURE WILL RESULT IN FREE WATER IN THE CABIN WHICH CAN POSE A HAZARD TO OTHER SYSTEMS. THE CREW SHOULD BE ABLE TO CONTROL THE LEAK IF IT CAN BE DETECTED.

HIGHEST CRITICALITY HDW/FUNC DATE: 12/02/87

SUBSYSTEM: CREW EQUIPMENT MDAC ID: 15189 FLIGHT: 3/2R

ABORT: /

RHS OUTLET SOLENOID VALVE (SV3) ITEM:

FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: B. RICHARD SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) GALLEY
- 3) RHS WATER SUPPLY
- 4) OUTLET SOLENOID VALVE
- 5) SEAL
- 6)
- 7) 8)
- 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	,	RTLS:	/
LIFTOFF:	./	TAL:	/
ONORBIT:	3/2R	AOA:	/
DEORBIT:		ATO:	/
LANDING/SAFING:	: /		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: GALLEY PART NUMBER: SV3

CAUSES: PIECE-PART FAILURE

EFFECTS/RATIONALE:

THIS FAILURE WILL RESULT IN FREE WATER IN THE CABIN WHICH CAN POSE A HAZARD TO OTHER SYSTEMS. THE CREW SHOULD BE ABLE TO CONTROL THE LEAK IF IT CAN BE DETECTED.

DATE: 12/02/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: CREW EQUIPMENT FLIGHT: 3/2R MDAC ID: 15190 ABORT: /

ITEM: RHS CHILLED WATER FEED SOLENOID VALVE (SV4)

FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: B. RICHARD SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) GALLEY
- 3) RHS WATER SUPPLY SYSTEM
- 4) CHILLED WATER FEED SOLENOID VALVE
- 5) SEAL
- 6)
- 7)
- 8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC	
PRELAUNCH:	/	RTLS:	/	
LIFTOFF:	/	TAL:	,	
ONORBIT:	3/2R	AOA:	,	
DEORBIT:		ATO:	1	
LANDING/SAFING	: /		•	

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: GALLEY PART NUMBER: SV4

CAUSES: PIECE-PART FAILURE

EFFECTS/RATIONALE:

THIS FAILURE WILL RESULT IN FREE WATER IN THE CABIN WHICH CAN POSE A HAZARD TO OTHER SYSTEMS. THE CREW SHOULD BE ABLE TO CONTROL THE LEAK IF IT CAN BE DETECTED.

HIGHEST CRITICALITY HDW/FUNC 12/03/87 DATE: 3/3 FLIGHT: SUBSYSTEM: CREW EQUIPMENT ABORT: 15191 MDAC ID: CHECK VALVE ITEM: FAILURE MODE: FAILS OPEN LEAD ANALYST: B. RICHARD SUBSYS LEAD: S.K. SINCLAIR BREAKDOWN HIERARCHY: 1) CREW EQUIPMENT 2) GALLEY 3) WATER SUPPLY 4) CHECK VALVE 5) 6) 7) 8) 9) CRITICALITIES HDW/FUNC ABORT HDW/FUNC FLIGHT PHASE RTLS: TAL: AOA: / / PRELAUNCH: LIFTOFF: 3/3 ONORBIT: ATO: DEORBIT: LANDING/SAFING: REDUNDANCY SCREENS: A [] B [] C []

LOCATION: GALLEY

PART NUMBER:

CAUSES: CONTAMINATION, PIECE-PART FAILURE

EFFECTS/RATIONALE:

THE CHECK VALVE ALLOWS A FLOW OF HOT WATER THROUGH MV2 TO THE AUXILIARY PORT. THIS FAILURE WOULD HAVE VERY LITTLE EFFECT ON THE OPERATION OF THE GALLEY AND COULD EVEN GO UNNOTICED.

DATE: 12/03/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: CREW EQUIPMENT FLIGHT: 3/3 MDAC ID: 15192 ABORT: / ITEM: CHECK VALVE FAILURE MODE: FAILS CLOSED LEAD ANALYST: B. RICHARD SUBSYS LEAD: S.K. SINCLAIR BREAKDOWN HIERARCHY: 1) CREW EQUIPMENT 2) GALLEY 3) WATER SUPPLY 4) CHECK VALVE 5) 6) 7) 8) 9) CRITICALITIES FLIGHT PHASE HDW/FUNC ABORT HDW/FUNC RTLS: PRELAUNCH: / LIFTOFF: TAL: ONORBIT: 3/3 AOA: DEORBIT: ATO: LANDING/SAFING: REDUNDANCY SCREENS: A [] B [] C [] LOCATION: GALLEY PART NUMBER:

CAUSES: CONTAMINATION, PIECE-PART FAILURE

EFFECTS/RATIONALE:

THIS FAILURE WOULD PREVENT HOT WATER FROM BEING AVAILABLE TO THE AUXILIARY PORT BUT WOULD HAVE NO ADVERSE EFFECT ON THE NORMAL OPERATION OF THE GALLEY.

DATE: 12/03/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: CREW EQUIPMENT FLIGHT: 3/2R MDAC ID: 15193 ABORT: /

ITEM: CHECK VALVE SEAL FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: B. RICHARD SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) GALLEY
- 3) WATER SUPPLY
- 4) CHECK VALVE
- 5) SEAL
- 6)
- 7)
- 8)
- 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	,	RTLS:	/
LIFTOFF:	,	TAL:	/
ONORBIT:	3/2R	AOA:	/
DEORBIT:	./	ATO:	/
LANDING/SAFING	: /		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: GALLEY

PART NUMBER:

CAUSES: PIECE-PART FAILURE

EFFECTS/RATIONALE:

THIS FAILURE WOULD RESULT IN FREE WATER IN THE CABIN WHICH COULD BE A HAZARD TO OTHER SYSTEMS. THE CREW SHOULD BE ABLE TO CONTROL THE LEAK IF IT CAN BE DETECTED.

DATE: 12/03/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: CREW EQUIPMENT FLIGHT: 3/2R MDAC ID: 15194 ABORT:

ITEM: MIXING VALVE (MV2) FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: B. RICHARD SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) GALLEY
 3) WATER SUPPLY
- 4) MIXING VALVE (MV2)
- 5) SEAL
- 6)
- 7)
- 8) 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC ABORT HDW/FUNC
PRELAUNCH: / RTLS: /
TAL: / / / 3/2R ONORBIT: AOA: LANDING/SAFING: / ATO:

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: GALLEY PART NUMBER: MV2

CAUSES: PIECE-PART FAILURE

EFFECTS/RATIONALE:

THIS FAILURE WILL RESULT IN FREE WATER IN THE CABIN WHICH MAY POSE A HAZARD TO OTHER SYSTEMS. THE CREW SHOULD BE ABLE TO CONTROL THE LEAK IF IT CAN BE DETECTED.

HIGHEST CRITICALITY HDW/FUNC 12/03/87 DATE: SUBSYSTEM: CREW EQUIPMENT FLIGHT: 3/3 ABORT: MDAC ID: 15195 MICROBIAL CHECK VALVE ITEM: FAILURE MODE: RESTRICTED FLOW LEAD ANALYST: B. RICHARD SUBSYS LEAD: S.K. SINCLAIR BREAKDOWN HIERARCHY: 1) CREW EQUIPMENT 2) GALLEY 3) WATER SUPPLY 4) MICROBIAL CHECK VALVE 5) 6) 7) 8) 9) CRITICALITIES HDW/FUNC ABORT HDW/FUNC FLIGHT PHASE RTLS: TAL: / PRELAUNCH:

ATO: DEORBIT: LANDING/SAFING:

3/3

REDUNDANCY SCREENS: A [] B [] C [

GALLEY LOCATION:

PART NUMBER:

CAUSES: CONTAMINATION

LIFTOFF:

ONORBIT:

EFFECTS/RATIONALE:

THE WORST CASE RESTRICTION WILL PREVENT USING THE AUXILLARY PORT. THE NORMAL OPERATION OF THE GALLEY WILL NOT BE AFFECTED BY THIS FAILURE.

AOA:

1

DATE: 12/03/87 HIGHEST CRITICALITY HDW/FUNC FLIGHT: SUBSYSTEM: CREW EQUIPMENT 3/2R

MDAC ID: 15196 ABORT: /

ITEM: MICROBIAL CHECK VALVE SEAL

FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: B. RICHARD SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) GALLEY
- 3) WATER SUPPLY
- 4) MICROBIAL CHECK VALVE
- 5) SEAL
- 6)
- 7)
- 8) 9)

CRITICALITIES

HDW/FUNC ABORT HDW/FUNC RTLS: FLIGHT PHASE 3/2R PRELAUNCH: TAL: LIFTOFF: . AOA: ONORBIT: DEORBIT: ATO: LANDING/SAFING: /

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: GALLEY

PART NUMBER:

CAUSES: PIECE-PART FAILURE

EFFECTS/RATIONALE:

THIS FAILURE WILL RESULT IN FREE WATER IN THE CABIN WHICH MAY POSE A HAZARD TO OTHER SYSTEMS. THE CREW SHOULD BE ABLE TO CONTROL THE LEAK IF IT CAN BE DETECTED.

12/03/87

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: CREW EQUIPMENT

FLIGHT: 3/2R

MDAC ID: 15197

ABORT:

ITEM:

LINES AND FITTINGS (SEALS)

FAILURE MODE: EXTERNAL LEAKAGE

SUBSYS LEAD: S.K. SINCLAIR LEAD ANALYST: B. RICHARD

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) GALLEY
- 3) WATER SUPPLY
- 4) LINES AND FITTINGS
- 5) SEALS

6)

7)

8)

9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	./	RTLS:	/
LIFTOFF:	/	TAL:	/
ONORBIT:	3/2R	AOA:	/
DEORBIT:	/	ATO:	/
LANDING/SAFIN	G: /		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: GALLEY

PART NUMBER:

CAUSES: PIECE-PART FAILURE

EFFECTS/RATIONALE:

THIS FAILURE WILL RESULT IN FREE WATER IN THE CABIN WHICH MAY POSE A HAZARD TO OTHER SYSTEMS. THE CREW SHOULD BE ABLE TO CONTROL THE LEAK IF IT CAN BE DETECTED.

12/03/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: CREW EQUIPMENT FLIGHT: 3/3 MDAC ID: 15198 ABORT: LINES AND FITTINGS (SEALS) ITEM: FAILURE MODE: RESTRICTED FLOW LEAD ANALYST: B. RICHARD SUBSYS LEAD: S.K. SINCLAIR BREAKDOWN HIERARCHY: 1) CREW EQUIPMENT 2) GALLEY 3) WATER SUPPLY 4) LINES AND FITTINGS 5) 6) 7)

CRITICALITIES

FLIGHT PHASE HDW/FUNC ABORT HDW/FUNC PRELAUNCH: / RTLS: / LIFTOFF: / TAL: / ONORBIT: 3/3 AOA: / DEORBIT: / ATO: / LANDING/SAFING: /

REDUNDANCY SCREENS: A [] B [] C []

LOCATION: GALLEY

PART NUMBER:

8) 9)

CAUSES: CONTAMINATION

EFFECTS/RATIONALE:

THE WORST CASE RESTRICTION WOULD PREVENT USE OF THE GALLEY - OTHER SOURCES OF WATER WOULD HAVE TO BE USED.

HIGHEST CRITICALITY HDW/FUNC 12/03/87 DATE: FLIGHT: 3/2R

SUBSYSTEM: CREW EQUIPMENT ABORT: MDAC ID: 15199

RHS NEEDLE SEAL ITEM: FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: B. RICHARD SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) GALLEY
- WATER SUPPLY 3)
- RHS NEEDLE 4)
- SEAL 5)
- 6)
- 7) 8)
- 9)

CRITICALITIES

HDW/FUNC ABORT HDW/FUNC FLIGHT PHASE RTLS: PRELAUNCH: / TAL: LIFTOFF: 3/2R AOA: ONORBIT: ATO: DEORBIT: LANDING/SAFING: /

REDUNDANCY SCREENS: A [2] B[P] C[P]

LOCATION: GALLEY

PART NUMBER:

CAUSES: CONTAMINATION

EFFECTS/RATIONALE:

THE FAILURE WILL RESULT IN FREE WATER IN THE CABIN WHICH MAY POSE A HAZARD TO OTHER SYSTEMS. THE CREW SHOULD BE ALBE TO CONTROL THE LEAK.

DATE: 12/03/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: CREW EQUIPMENT FLIGHT: 3/2R MDAC ID: 15200 ABORT: /

ITEM: TEMP GAGE SEAL FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: B. RICHARD SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) GALLEY
- 3) WATER SUPPLY
- 4) TEMP GAGE
- 5) SEAL
- 6)
- 7)
- 8)
- 9)

CRITICALITIES

	VIII - VIII - Z		
FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	/	RTLS:	,
LIFTOFF:	/	TAL:	/
ONORBIT:	3/2R	AOA:	,
DEORBIT:	/	ATO:	/
LANDING/SAFING	3: /	•	,

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: GALLEY

PART NUMBER:

CAUSES: PIECE-PART FAILURE

EFFECTS/RATIONALE:

THE FAILURE WILL RESULT IN FREE WATER IN THE CABIN WHICH MAY POSE A HAZARD TO OTHER SYSTEMS. THE CREW SHOULD BE ABLE TO CONTROL THIS LEAK IF IT CAN BE DETECTED.

DATE:

12/03/87

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: CREW EQUIPMENT

FLIGHT: 3/2R

/

MDAC ID: 15203

ABORT:

ITEM:

RTD SEAL

FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: B. RICHARD SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) GALLEY
- 3) WATER SUPPLY
- 4) RTD
- 5) SEAL

6)

7)

8)

9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	/	RTLS:	/
LIFTOFF:	/	TAL:	/
ONORBIT:	3/2R	AOA:	
DEORBIT:	/	ATO:	
LANDING/SAFIN	G: /		·

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: GALLEY

PART NUMBER:

CAUSES: PIECE-PART FAILURE

EFFECTS/RATIONALE:

THIS FAILURE WILL RESULT IN FREE WATER IN THE CABIN WHICH MAY POSE A HAZARD TO OTHER SYSTEMS. THE CREW SHOULD BE ABLE TO CONTROL THE LEAK IF IT CAN BE DETECTED.

HIGHEST CRITICALITY HDW/FUNC 12/03/87 DATE: SUBSYSTEM: CREW EQUIPMENT FLIGHT: 3/3 ABORT: / MDAC ID: 15204 WATER HEATER SW (S2) ITEM: FAILURE MODE: SHORTED LEAD ANALYST: B. RICHARD SUBSYS LEAD: S.K. SINCLAIR BREAKDOWN HIERARCHY: 1) CREW EQUIPMENT 2) GALLEY 3) ELECTRICAL 4) WATER HEATER SWITCH 5) 6) 7) 8) 9) CRITICALITIES HDW/FUNC ABORT HDW/FUNC FLIGHT PHASE RTLS: PRELAUNCH: / TAL: LIFTOFF: 3/3 AOA: ONORBIT: ATO: DEORBIT: LANDING/SAFING: REDUNDANCY SCREENS: A [] B [] C []

LOCATION: GALLEY PART NUMBER: S2

CAUSES: CONTAMINATION, PIECE-PART FAILURE

EFFECTS/RATIONALE:

SHORT TO CASE WILL CAUSE CIRCUIT BREAKER TO TRIP.

HIGHEST CRITICALITY HDW/FUNC 12/03/87 DATE: FLIGHT: 3/3 SUBSYSTEM: CREW EQUIPMENT ABORT: / MDAC ID: 15205 OVEN HEATER SWITCH (S1) ITEM: FAILURE MODE: SHORTED LEAD ANALYST: B. RICHARD SUBSYS LEAD: S.K. SINCLAIR BREAKDOWN HIERARCHY: 1) CREW EQUIPMENT 2) GALLEY ELECTRICAL 3) 4) OVEN HEATER SW (S1) 5) 6) 7) 8) 9) CRITICALITIES HDW/FUNC ABORT HDW/FUNC FLIGHT PHASE RTLS: PRELAUNCH: / TAL:

DEORBIT: /
LANDING/SAFING: /

REDUNDANCY SCREENS: A [] B [] C []

ATO:

3/3

LOCATION: GALLEY PART NUMBER: S1

LIFTOFF:

ONORBIT:

CAUSES: CONTAMINATION, PIECE-PART FAILURE

EFFECTS/RATIONALE:

SHORT TO CASE WILL CAUSE CIRCUIT BREAKER TO TRIP.

DATE: 12/03/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: CREW EQUIPMENT FLIGHT: 3/3 MDAC ID: 15206 ABORT: ITEM: OVEN BLOWER SWITCH (S3) FAILURE MODE: SHORTED LEAD ANALYST: B. RICHARD SUBSYS LEAD: S.K. SINCLAIR BREAKDOWN HIERARCHY: 1) CREW EQUIPMENT 2) GALLEY 3) ELECTRICAL 4) OVEN BLOWER SWITCH 5) 6) 7) 8) 9) CRITICALITIES HDW/FUNC ABORT FLIGHT PHASE HDW/FUNC / PRELAUNCH: RTLS: LIFTOFF: TAL: ONORBIT: 3/3 AOA: DEORBIT: ATO: LANDING/SAFING: / REDUNDANCY SCREENS: A [] B [] C [LOCATION: GALLEY

PART NUMBER: S3

CAUSES: CONTAMINATION, PIECE-PART FAILURE

EFFECTS/RATIONALE:

SHORT TO CASE WILL CAUSE CIRCUIT BREAKER TO TRIP.

HIGHEST CRITICALITY HDW/FUNC DATE: 12/03/87 FLIGHT: SUBSYSTEM: CREW EQUIPMENT 3/3 15207 ABORT: MDAC ID: WATER HEATER STRIP HEATER (HR1-HR6) ITEM: FAILURE MODE: SHORTED LEAD ANALYST: B. RICHARD SUBSYS LEAD: S.K. SINCLAIR BREAKDOWN HIERARCHY: 1) CREW EQUIPMENT 2) GALLEY 3) ELECTRICAL WATER HEATER STRIP HEATER 4) 5) 6) 7) 8) 9) CRITICALITIES HDW/FUNC ABORT HDW/FUNC FLIGHT PHASE

TAL: LIFTOFF: 3/3 AOA: ONORBIT: ATO: DEORBIT:

RTLS:

LANDING/SAFING:

REDUNDANCY SCREENS: A [] B [] C []

/

LOCATION: GALLEY PART NUMBER: HR1-HR6

PRELAUNCH:

CAUSES: CONTAMINATION, PIECE-PART FAILURE

EFFECTS/RATIONALE:

SHORT TO CASE WILL CAUSE CIRCUIT BREAKER TO TRIP.

12/03/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: CREW EQUIPMENT FLIGHT: 3/3 MDAC ID: 15208 ABORT: / WATER HEATER STRIP HEATER THERMOSTAT S1-S12 ITEM: FAILURE MODE: SHORTED LEAD ANALYST: B. RICHARD SUBSYS LEAD: S.K. SINCLAIR BREAKDOWN HIERARCHY: 1) CREW EQUIPMENT 2) GALLEY 3) ELECTRICAL 4) WATER HEATER STRIP HEATER THERMOSTAT 5) 6) 7) 8) 9) CRITICALITIES HDW/FUNC ABORT HDW/FUNC FLIGHT PHASE PRELAUNCH: / RTLS: LIFTOFF: TAL: ONORBIT: 3/3 AOA: DEORBIT: ATO: LANDING/SAFING: / REDUNDANCY SCREENS: A [] B [] C [] LOCATION: GALLEY

PART NUMBER: S1-S12

CAUSES: CONTAMINATION, PIECE-PART FAILURE

EFFECTS/RATIONALE:

SHORT TO CASE WILL TRIP THE CIRCUIT BREAKER.

HIGHEST CRITICALITY HDW/FUNC 12/03/87 DATE: SUBSYSTEM: CREW EQUIPMENT FLIGHT: 3/3 ABORT: MDAC ID: 15209 OVEN STRIP HEATERS (HR1-HR4) ITEM: FAILURE MODE: SHORTED LEAD ANALYST: B. RICHARD SUBSYS LEAD: S.K. SINCLAIR BREAKDOWN HIERARCHY: 1) CREW EQUIPMENT 2) GALLEY 3) ELECTRICAL 4) OVEN STRIP HEATERS 5) 6) 7) 8) 9) CRITICALITIES HDW/FUNC ABORT HDW/FUNC FLIGHT PHASE RTLS: / PRELAUNCH: TAL: LIFTOFF: 3/3 AOA: ONORBIT: ATO: DEORBIT:

REDUNDANCY SCREENS: A [] B [] C []

LOCATION: GALLEY PART NUMBER: HR1-HR4

LANDING/SAFING:

CAUSES: CONTAMINATION, PIECE-PART FAILURE

EFFECTS/RATIONALE:

SHORT TO CASE WILL CAUSE CIRCUIT BREAKER TO TRIP.

DATE: 12/03/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: CREW EQUIPMENT FLIGHT: 3/3 MDAC ID: 15210 ABORT: ITEM: OVEN HEATER THERMOSTATS (S1-S8) FAILURE MODE: SHORTED LEAD ANALYST: B. RICHARD SUBSYS LEAD: S.K. SINCLAIR BREAKDOWN HIERARCHY: 1) CREW EQUIPMENT 2) GALLEY 3) ELECTRICAL 4) OVEN HEATER THERMOSTATS 5) 6) 7) 8) 9)

CRITICALITIES

FLIGHT PHASE HDW/FUNC ABORT HDW/FUNC PRELAUNCH: RTLS: LIFTOFF: TAL: 3/3 ONORBIT: AOA: DEORBIT: ATO: LANDING/SAFING:

REDUNDANCY SCREENS: A [] B [] C [

LOCATION: GALLEY PART NUMBER: S1-S8

CAUSES: CONTAMINATION, PIECE-PART FAILURE

EFFECTS/RATIONALE:

SHORT TO CASE WILL CAUSE CIRCUIT BREAKER TO TRIP.

HIGHEST CRITICALITY HDW/FUNC 12/03/87 DATE: FLIGHT: 3/3 SUBSYSTEM: CREW EQUIPMENT ABORT: MDAC ID: 15211 / ITEM: HOT WATER THERMOSTAT (S13) FAILURE MODE: SHORTED LEAD ANALYST: B. RICHARD SUBSYS LEAD: S.K. SINCLAIR BREAKDOWN HIERARCHY: 1) CREW EQUIPMENT 2) GALLEY 3) ELECTRICAL 4) HOT WATER THERMOSTAT 5) 6) 7) 8) 9) CRITICALITIES HDW/FUNC ABORT FLIGHT PHASE HDW/FUNC RTLS: TAL: PRELAUNCH: / LIFTOFF: 3/3 AOA: ONORBIT: ATO: DEORBIT: LANDING/SAFING: REDUNDANCY SCREENS: A [] B [] C [LOCATION: GALLEY

LOCATION: GALLEY PART NUMBER: \$13

CAUSES: CONTAMINATION, PIECE-PART FAILURE

EFFECTS/RATIONALE:

SHORT TO CASE WILL CAUSE CIRCUIT BREAKER TO TRIP.

HIGHEST CRITICALITY HDW/FUNC DATE: 12/03/87 SUBSYSTEM: CREW EQUIPMENT FLIGHT: 3/3 MDAC ID: 15212 ABORT: ITEM: WIRE HARNESS FAILURE MODE: SHORTED LEAD ANALYST: B. RICHARD SUBSYS LEAD: S.K. SINCLAIR BREAKDOWN HIERARCHY: 1) CREW EQUIPMENT 2) GALLEY 3) ELECTRICAL 4) WIRE HARNESS 5) 6) 7) 8) 9) CRITICALITIES HDW/FUNC ABORT HDW/FUNC FLIGHT PHASE

RTLS: TAL: PRELAUNCH: // / LIFTOFF: 3/3 AOA: ONORBIT: DEORBIT: DEORBIT: /
LANDING/SAFING: / ATO:

REDUNDANCY SCREENS: A [] B [] C []

LOCATION: GALLEY PART NUMBER:

CAUSES: MECHANICAL SHOCK, PIECE-PART FAILURE

EFFECTS/RATIONALE:

WORST CASE FAILURE COULD RESULT IN LOSS OF GALLEY. ALTERNATE SOURCE OF WATER WOULD HAVE TO BE USED FOR COMPLETION OF MISSION.

DATE:

12/02/87

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: CREW EQUIPMENT

FLIGHT:

3/2R

MDAC ID: 15325

ABORT:

/NA

ITEM:

OWDA SLIDE ASSEMBLY

FAILURE MODE: STUCK IN UP OR DOWN POSITION

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- OWDA 2)
- 3) SLIDE ASSEMBLY
- 4)
- 5)
- 6)
- 7)
- 8)

9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	/NA	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	3/2R	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING	: /NA		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION:

CREW MODULE PART NUMBER: SED 48101600

CAUSES: CONTAMINATION, MISHANDLING/ABUSE

EFFECTS/RATIONALE:

SLIDE ASSEMBLY IS STUCK IN UP OR DOWN POSITION. CREW IS UNABLE TO DISPENSE WATER WITH THE OWDA. IF CWDA SUBSEQUENTLY FAILS, MISSION SHOULD BE TERMINATED.

DATE: 12/02/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: CREW EQUIPMENT FLIGHT: 3/3

MDAC ID: 15326 ABORT: /NA

ITEM: OWDA SLIDE ASSEMBLY FAILURE MODE: STRUCTURAL FAILURE

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) OPERATIONAL WATER DISPENSER
- 3) SLIDE ASSEMBLY
- 4) HANDLE
- 5)
- 6)
- 7) 8)
- 9)

CRITICALITIES

HDW/FUNC	ABORT	HDW/FUNC	
/NA	RTLS:	/NA	
/NA	TAL:	/NA	
3/3	AOA:	/NA	
/NA	ATO:	/NA	
: /NA		,	
	HDW/FUNC /NA /NA 3/3 /NA	HDW/FUNC ABORT /NA RTLS: /NA TAL: 3/3 AOA: /NA ATO:	

REDUNDANCY SCREENS: A [] B [] C []

LOCATION: CREW MODULE PART NUMBER: SED48101600

CAUSES: OVERLOAD, PIECE-PART FAILURE

EFFECTS/RATIONALE:

HANDLE BREAKS BUT SLIDE ASSEMBLY STILL ACCESSIBLE AND OWDA IS

STILL USABLE.

DATE: 12/02/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: CREW EQUIPMENT FLIGHT: 3/2R MDAC ID: 15327 ABORT: /NA

ITEM: REHYDRATION NEEDLE

FAILURE MODE: NO FLOW

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) OPERATIONAL WATER DISPENSER
- 3) NEEDLE
- 4)
- 5)
- 6)
- 7)
- 8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	/NA	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	3/2R	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING	: /NA		•

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: CREW MODULE PART NUMBER: SED48101600

CAUSES: CONTAMINATION, STRUCTURAL FAILURE

EFFECTS/RATIONALE:

CONTAMINATION OR BENDING PREVENTS WATER FLOW THROUGH REHYDRATION NEEDLE. IF SPARE NEEDLE AND CONTINGENCY WATER DISPENSER SUBSEQUENTLY FAIL, THEN MISSION SHOULD BE TERMINATED.

DATE: 12/02/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: CREW EQUIPMENT FLIGHT: 3/3 MDAC ID: 15328 ABORT: /NA

ITEM: O-RING

FAILURE MODE: INTERNAL/EXTERNAL LEAKAGE

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) OPERATIONAL WATER DISPENSER
- 3) SLIDE ASSEMBLY
- 4) O-RING
- 5)
- 6)
- 7)
- 8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC	
PRELAUNCH:	/NA	RTLS:	/NA	
LIFTOFF:	/NA	TAL:	/NA	
ONORBIT:	3/3	AOA:	/NA	
DEORBIT:	/NA	ATO:	/NA	
LANDING/SAFING	G: /NA			

REDUNDANCY SCREENS: A [] B [] C []

LOCATION: CREW MODULE PART NUMBER: SED48101600

CAUSES: CONTAMINATION, DEFECTIVE MATERIAL

EFFECTS/RATIONALE:

LEAKAGE FROM THE O-RING MAY RESULT IN A SMALL AMOUNT OF WATER BEING FREE IN THE CABIN. THE WATER CAN BE CONTAINED BY THE CREW WITH NO RESULTING DAMAGE OR SAFETY IMPLICATIONS.

SUBSYSTEM: CREW EQUIPMENT

MDAC ID: 15000

MDAC ID: 15329

ABORT:

/NA

ITEM:

SOLENOID VALVE - OWDA

FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) OPERATIONAL WATER DISPENSER
- 3) SOLENOID VALVE

4)

5)

6)

7)

8) 9)

CRITICALITIES

	~-·		
FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	/NA	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	3/2R	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING	: /NA		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: CREW MODULE

PART NUMBER: SED48101600

CAUSES: SEAL DAMAGE

EFFECTS/RATIONALE:

DAMAGE TO THE SOLENOID VALVE SEAL MAY ALLOW A SMALL AMOUNT OF WATER TO LEAK INTO THE CREW MODULE. IF SMALL ENOUGH, THE LEAK CAN BE CONTAINED BY THE CREW AND THE OWDA WILL REMAIN OPERATIONAL. HOWEVER, A LARGE LEAK WILL CAUSE THE SOLENOID VALVE AND OWDA TO BE CONSIDERED BROKEN.

DATE: 12/02/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: CREW EQUIPMENT FLIGHT: 3/3 MDAC ID: 15330 ABORT: /NA

ITEM: OPERATIONAL WATER DISPENSER PRESSURE REGULATOR

FAILURE MODE: REGULATES HIGH

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) OPERATIONAL WATER DISPENSER
- 3) PRESSURE REGULATOR
- 4)
- 5)
- 6)
- 7)
- 8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	/NA	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	3/3	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING	: /NA		

REDUNDANCY SCREENS: A [] B [] C []

LOCATION: CREW MODULE PART NUMBER: SED48101600

CAUSES: CONTAMINATION, SPRING BREAKS, MECHANISM JAMS

EFFECTS/RATIONALE:

WATER PRESSURE AND DELIVERED FLOW RATE ARE INCREASED. CREW CAN USE A LOWER VOLUME SETTING OR THE BYPASS VALVE TO CONTINUE OPERATION OF THE OWDA.

SUBSYSTEM: CREW EQUIPMENT

MDAC ID: 15301

HIGHEST CRITICALITY HDW/FUNC FLIGHT: 3/2R ABORT: 3/2R MDAC ID: 15331

ITEM: BYPASS VALVE FAILURE MODE: EXTERNAL LEAKAGE

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) OPERATIONAL WATER DISPENSER
- 3) BYPASS VALVE
- 4)
- 5)
- 6)
- 7)
- 8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	/NA	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	3/2R	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFIN	NG: /NA		·

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: CREW MODULE PART NUMBER: SED48101600

CAUSES: SEAL DAMAGE

EFFECTS/RATIONALE:

DAMAGE TO THE BYPASS VALVE SEAL WILL CAUSE A LEAK INTO THE CREW MODULE. IF THE LEAK IS SMALL ENOUGH THE WATER CAN BE CONTAINED BY THE CREW AND THE OWDA WILL REMAIN OPERATIONAL. HOWEVER, IN THE WORST CASE, THE LEAKAGE WILL CAUSE A REDUCTION IN THE WATER DELIVERED TO THE CREW AND NON-OPERATION OF THE OWDA. LOSS OF ALL WATER DELIVERY REDUNDANCY WILL RESULT IN MISSION TERMINATION.

DATE: 12/03/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: CREW EQUIPMENT FLIGHT: 3/2R MDAC ID: 15332 ABORT: /NA

ITEM: OWDA WATER SELECTION VALVE

FAILURE MODE: INTERNAL/LEAKAGE VALVE

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) OPERATIONAL WATER DISPENSER
- 3) WATER SELECTION VALVE
- 4)
- 5)
- 6)
- 7) 8)
- 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC	
PRELAUNCH:	/NA	RTLS:	/NA	
LIFTOFF:	/NA	TAL:	<u>/</u> NA	
ONORBIT:	3/2R	AOA:	/NA	
DEORBIT:	/NA	ATO:	/NA	
LANDING/SAFING	: /NA			

LANDING/SAFING: /NA

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: CREW MODULE PART NUMBER: SED48101600

CAUSES: SEAL DAMAGE

EFFECTS/RATIONALE:

DAMAGE TO WATER SELECTION VALVE SEAL MAY ALLOW WATER TO LEAK INTO THE CREW MODULE. IF THE LEAK IS SMALL, THE WATER CAN BE CONTAINED BY THE CREW AND THE OWDA WILL REMAIN OPERATIONAL. HOWEVER, A WORST CASE LEAK WILL RESULT IN INSUFFICIENT WATER REACHING THE REHYDRATION NEEDLE AND AN INOPERABLE OWDA. IN THIS CASE, LOSS OF ALL REDUNDANCY WILL RESULT IN MISSION TERMINATION.

DATE:

12/03/87

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: CREW EQUIPMENT

FLIGHT: 3/2R

MDAC ID: 15333

ABORT:

/NA

ITEM:

HOSE ASSEMBLY

FAILURE MODE: INTERNAL/EXTERNAL LEAKAGE

LEAD ANALYST: S.K. SINCLAIR

SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) OPERATIONAL WATER DISPENSER
- 3) HOSE ASSEMBLY
- 4)
- 5)
- 6)
- 7)
- 8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC	
PRELAUNCH:	/NA	RTLS:	/NA	
LIFTOFF:	/NA	TAL:	/NA	
ONORBIT:	3/2R	AOA:	/NA	
DEORBIT:	/NA	ATO:	/NA	
LANDING/SAFIN	NG: /NA			

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: CREW MODULE

PART NUMBER: SED48101600

CAUSES: MECHANICAL SHOCK, VIBRATION, DEFECTIVE MATERIAL

EFFECTS/RATIONALE:

A LEAK IN THE LINE GOING FROM THE ORBITER WATER SUPPLY TO THE OWDA WILL RESULT IN WATER IN THE CABIN AND AN INOPERABLE OWDA. SUBSEQUENT FAILURES IN THE WATER DELIVERY SYSTEM WILL RESULT IN MISSION TERMINATION.

HIGHEST CRITICALITY HDW/FUNC 12/03/87 DATE: SUBSYSTEM: CREW EQUIPMENT FLIGHT: 3/3 MDAC ID: 15334 ABORT: /NA ITEM: OWDA - ROTARY SWITCH FAILURE MODE: FAILS CLOSED LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: S.K. SINCLAIR BREAKDOWN HIERARCHY: 1) CREW EQUIPMENT 2) OPERATIONAL WATER DISPENSER 3) ROTARY SWITCH 4) 5) 6) 7) 8) 9) CRITICALITIES

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FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	/NA	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	3/3	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING	: /NA		•

REDUNDANCY SCREENS: A [] B [] C []

LOCATION: CREW MODULE PART NUMBER: SED48101600

CAUSES: CONTAMINATION, MECHANICAL SHOCK, VIBRATION

EFFECTS/RATIONALE:

THE OWDA ROTARY SWITCH FAILS TO A GIVEN POSITION WHICH WILL PERMIT ONLY ONE QUANTITY OF WATER TO BE DELIVERED. THE OWDA IS STILL OPERATIONAL BY USING THE BYPASS VALVE.

DATE:

12/03/87

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: CREW EQUIPMENT

FLIGHT:

3/2R

MDAC ID:

15335

ABORT:

/NA

ITEM:

OWDA - ON/OFF SWITCH

FAILURE MODE: LOSS OF OUTPUT

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) OPERATIONAL WATER DISPENSER
- 3) ON/OFF SWITCH
- 4)
- 5)
- 6)
- 7)
- 8)
- 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC	
PRELAUNCH:	/NA	RTLS:	/NA	
LIFTOFF:	/NA	TAL:	/NA	
ONORBIT:	3/2R	AOA:	/NA	
DEORBIT:	/NA	ATO:	/NA	
LANDING/SAFING	: /NA			

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION:

CREW MODULE

PART NUMBER: SED48101600

CAUSES: CONTAMINATION, MECHANICAL SHOCK, VIBRATION

EFFECTS/RATIONALE:

LOSS OF OUTPUT FROM THE ON/OFF SWITCH MEANS THE OWDA CANNOT BE OPERATED IN ITS NOMINAL MODE. THE BYPASS VALVE AND THE CONTINGENCY WATER DISPENSER ARE STILL AVAILABLE. HOWEVER, THE MISSION MUST BE TERMINATED FOR LOSS OF ALL WATER DELIVERY REDUNDANCY.

DATE: 12/03/87 HIGHEST CRITICALITY HDW/FUNC SUBSYSTEM: CREW EQUIPMENT FLIGHT:
ABORT: 3/3 MDAC ID: 15336 /NA ITEM: OWDA - ON/OFF SWITCH FAILURE MODE: FAILS ON LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: S.K. SINCLAIR BREAKDOWN HIERARCHY: 1) CREW EQUIPMENT 2) OPERATIONAL WATER DISPENSER 3) ON/OFF SWITCH 4) 5) 6)

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FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	/NA	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	3/3	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING	: /NA		•

REDUNDANCY SCREENS: A [] B [] C []

LOCATION: CREW MODULE PART NUMBER: SED48101600

CAUSES: CONTAMINATION, VIBRATION

EFFECTS/RATIONALE:

7) 8) 9)

THE ON/OFF SWITCH FAILS ON WHICH RESULTS IN THE OWDA BEING CONTINUOUS POWERED. THIS CAN CAUSE INADVERTENT ACTIVATION BUT NO SAFETY CONCERNS.

DATE:

12/03/87

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: CREW EQUIPMENT

FLIGHT: 3/2R

MDAC ID: 15337

ABORT:

/NA

ITEM:

OWDA - FILL SWITCH

FAILURE MODE: FAILS OPEN

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) OPERATIONAL WATER DISPENSER
- 3) FILL SWITCH
- 4)
- 5)
- 6)
- 7) 8)
- 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	/NA	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	3/2R	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING	: /NA		

LANDING/SAFING: /NA

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: CREW MODULE PART NUMBER: SED48101600

CAUSES: CONTAMINATION, MECHANICAL SHOCK, VIBRATION

EFFECTS/RATIONALE:

IF THE OWDA FILL SWITCH FAILS OPEN, THE "AUTOMATIC" FEATURE OF THE REHYDRATION CYCLE WILL NOT OPERATE. THE BYPASS VALVE AND THE CONTINGENCY WATER VALVE ARE STILL AVAILABLE. MISSION TERMINATION WILL BE REQUIRED IF ALL WATER DELIVERY REDUNDANCY IS LOST.

DATE: 12/03/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: CREW EQUIPMENT FLIGHT: 3/2R MDAC ID: 15338 ABORT: /NA

ITEM: OWDA - FILL SWITCH

FAILURE MODE: FAILS CLOSED

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) OPERATIONAL WATER DISPENSER
- FILL SWITCH 3)
- 4)
- 5) 6)
- 7)
- 8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	/NA	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	3/2R	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFIN	G: /NA		•

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: CREW MODULE PART NUMBER: SED48101600

CAUSES: CONTAMINATION, MECHANICAL SHOCK

EFFECTS/RATIONALE:

THE OWDA FILL SWITCH FAILING CLOSED WILL RESULT IN NO WATER FLOW AFTER THE INITIAL WATER PULSE WHICH OCCURRED WHEN THE BUTTON FAILED. THE BYPASS VALVE AND THE CONTINGENCY WATER DISPENSER ARE STILL AVAILABLE.

DATE: 12/04/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: CREW EQUIPMENT FLIGHT: 3/2R MDAC ID: 15403 ABORT: /NA

ITEM: CWDA - CONNECTION TO ORBITER FAILURE MODE: UNABLE TO MAKE CONNECTION

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) CONTINGENCY WATER DISPENSER
- 3) CONNECTION TO ORBITER
- 4)
- 5)
- 6)
- 7)
- 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	/NA	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	3/2R	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFIN	G: /NA		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: CREW MODULE PART NUMBER: SED48101607

CAUSES: CONTAMINATION

EFFECTS/RATIONALE:

UNABLE TO CONNECT CWDA TO ORBITER WATER SUPPLY. THIS MEANS THE CWDA WILL NOT PROVIDE WATER TO THE CREW. IF ALL REDUNDANT METHODS OF WATER DELIVERY ARE LOST, MISSION TERMINATION WILL BE REQUIRED.

REFERENCES: JSC-20365, SED48101607

DATE: 12/10/87 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: CREW EQUIPMENT FLIGHT: 3/1R MDAC ID: 16409 ABORT: /NA

ITEM: TREADMILL QUICK DISCONNECT FAILURE MODE: JAMMED/FAILS TO RELEASE

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) TREADMILL
- 3) QUICK DISCONNECT
- 4)
- 5)
- 6)
- 7)
- 8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	/NA	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	3/1R	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFIN	G: /NA		. ,

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: CREW MODULE
PART NUMBER: 10131-10031-02

CAUSES: CONTAMINATION, MISHANDLING/ABUSE

EFFECTS/RATIONALE:

CANNOT REMOVE TREADMILL FROM: (1) LI OH DOOR FOR REINSTALLATION OF CREW SEAT; (2) MIDDECK FORWARD FLOOR TO ACCESS LOCKERS WITH CRITICAL EQUIPMENT.

REFERENCES: JSC-12770, SFOM VOL 12, 10131-10031

DATE:

12/10/87

HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: CREW EQUIPMENT

FLIGHT: 3/3

MDAC ID: 16410

ABORT:

/NA

ITEM:

TREADMILL MONITOR BATTERIES

FAILURE MODE: OPEN (ELECTRICAL), DEPLETED POWER

LEAD ANALYST: S.K. SINCLAIR SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) TREADMILL EXERCISER ASSEMBLY
- 3) PHYSIOLOGICAL MONITOR
- 4) BATTERIES
- 5)
- 6)
- 7)
- 8)
- 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	/NA	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	3/3	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING	: /NA		·

REDUNDANCY SCREENS: A [] B [] C []

LOCATION: CREW MODULE

PART NUMBER: 10131-10031

CAUSES: CONTAMINATION, MECHANICAL SHOCK, VIBRATION

EFFECTS/RATIONALE:

THE TREADMILL'S PHYSIOLOGICAL MONITOR WILL BE INOPERATIVE DUE TO LOSS OF BATTERY POWER. TREADMILL WILL STILL FUNCTION WITHOUT MONITOR.

REFERENCES: JSC-12770, SFOM VOL 12, 10131-10031

HIGHEST CRITICALITY HDW/FUNC DATE: 1/11/88 FLIGHT: SUBSYSTEM: CREW EQUIPMENT 3/1R

ABORT: /NA MDAC ID: 16512

CREWMAN OPTICAL ALIGNMENT SIGHT (COAS) ADJUSTMENT ITEM:

MECHANISM

FAILURE MODE: PHYSICAL BINDING/JAMMING

LEAD ANALYST: H. SAXON SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) COAS
- 3) ADJUSTMENT MECHANISM

4)

5)

6)

7)

8) 9)

CRITICALITIES

HDW/FUNC ABORT HDW/FUNC FLIGHT PHASE RTLS: /NA
TAL: /NA
AOA: /NA
ATO: /NA /NA /NA PRELAUNCH: /NA /NA /NA LIFTOFF: 3/1R ONORBIT: DEORBIT: DEORBIT: /NA LANDING/SAFING: /NA

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION:

CREW MODULE

PART NUMBER:

CAUSES: MISHANDLING/ABUSE, PIECE-PART FAILURE

EFFECTS/RATIONALE:

HIGHEST CRITICALITY HDW/FUNC 1/11/88 DATE: FLIGHT: 3/3 CREW EQUIPMENT SUBSYSTEM: ABORT: /NA MDAC ID: 16513 CREWMAN OPTICAL ALIGNMENT SIGHT (COAS) AFT MOUNT ITEM: ASSEMBLY FAILURE MODE: SEAT FAILS TO ADJUST UP OR DOWN LEAD ANALYST: H. SAXON SUBSYS LEAD: S.K. SINCLAIR BREAKDOWN HIERARCHY: 1) CREW EQUIPMENT 2) COAS AFT MOUNT ASSEMBLY 3) 4) 5) 6) 7) 8) 9) CRITICALITIES HDW/FUNC ABORT
/NA RTLS: HDW/FUNC FLIGHT PHASE /NA PRELAUNCH: /NA TAL: LIFTOFF: /NA AOA: /NA 3/3 ONORBIT: /NA ATO: /NA DEORBIT: LANDING/SAFING: /NA REDUNDANCY SCREENS: A [] B [] C [] LOCATION: CREW MODULE PART NUMBER: CAUSES: CONTAMINATION, MISHANDLING/ABUSE, PIECE-PART FAILURE EFFECTS/RATIONALE:

DATE: 1/11/88 HIGHEST CRITICALITY HDW/FUNC

SUBSYSTEM: CREW EQUIPMENT FLIGHT: 2/1R MDAC ID: 16514 ABORT: /NA

ITEM: CREWMAN OPTICAL ALIGNMENT SIGHT (COAS) AFT MOUNT

ASSEMBLY

FAILURE MODE: SEAT FAILS TO ADJUST UP OR DOWN

LEAD ANALYST: H. SAXON SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) COAS
- 3) AFT MOUNT ASSEMBLY

4)

5)

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	/NA	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	2/1R	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING	: /NA		•

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION:

CREW MODULE

PART NUMBER:

CAUSES: CONTAMINATION, MISHANDLING/ABUSE, PIECE-PART FAILURE

EFFECTS/RATIONALE:

DATE: 1/11/88 HIGHEST CRITICALITY HDW/FUNC FLIGHT: SUBSYSTEM: CREW EQUIPMENT 3/3 ABORT: /NA MDAC ID: 16515 CREWMAN OPTICAL ALIGNMENT SIGHT (COAS) AFT MOUNT ITEM: ASSEMBLY FAILURE MODE: SEAT FAILS TO ADJUST BACKWARD AND FORWARD LEAD ANALYST: H. SAXON SUBSYS LEAD: S.K. SINCLAIR BREAKDOWN HIERARCHY: 1) CREW EQUIPMENT 2) COAS 3) AFT MOUNT ASSEMBLY 4) 5) 6) 7) 8) 9) CRITICALITIES HDW/FUNC ABORT FLIGHT PHASE HDW/FUNC /NA RTLS: /NA PRELAUNCH: TAL: AOA: ATO: /NA /NA LIFTOFF: /NA ONORBIT: 3/3 LANDING/SAFING: /NA /NA REDUNDANCY SCREENS: A [] B [] C [] LOCATION: CREW MODULE PART NUMBER: CAUSES: CONTAMINATION, MISHANDLING/ABUSE, PIECE-PART FAILURE

REFERENCES:

EFFECTS/RATIONALE:

HIGHEST CRITICALITY HDW/FUNC DATE: 1/11/88 SUBSYSTEM: CREW EQUIPMENT FLIGHT: 3/1R

MDAC ID: 16516 ABORT: /NA

ASSEMBLY FAILURE CREWMAN OPTICAL ALIGNMENT SIGHT (COAS) AFT BRACKET

FAILURE MODE: SEAT FAILS TO ADJUST UP OR DOWN

SUBSYS LEAD: S.K. SINCLAIR LEAD ANALYST: H. SAXON

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) COAS
- 3) AFT BRACKET ASSEMBLY

4)

5)

6)

7)

8) 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	/NA	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	3/1R	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING	: /NA		·

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION: CREW MODULE

PART NUMBER:

CAUSES: CONTAMINATION, MISHANDLING/ABUSE, PIECE-PART FAILURE

EFFECTS/RATIONALE:

1/11/88 HIGHEST CRITICALITY HDW/FUNC DATE:

FLIGHT: 2/1R SUBSYSTEM: CREW EQUIPMENT MDAC ID: 16517 /NA ABORT:

CREWMAN OPTICAL ALIGNMENT SIGHT (COAS) AFT BRACKET ITEM:

ASSEMBLY

FAILURE MODE: SEAT FAILS TO ADJUST BACWARD AND FORWARD

LEAD ANALYST: H. SAXON SUBSYS LEAD: S.K. SINCLAIR

BREAKDOWN HIERARCHY:

- 1) CREW EQUIPMENT
- 2) COAS
- AFT BRACKET ASSEMBLY 3)
- 4)
- 5)
- 6)
- 7) 8)
- 9)

CRITICALITIES

FLIGHT PHASE	HDW/FUNC	ABORT	HDW/FUNC
PRELAUNCH:	/NA	RTLS:	/NA
LIFTOFF:	/NA	TAL:	/NA
ONORBIT:	2/1R	AOA:	/NA
DEORBIT:	/NA	ATO:	/NA
LANDING/SAFING:	/NA		

REDUNDANCY SCREENS: A [2] B [P] C [P]

LOCATION:

CREW MODULE

PART NUMBER:

CAUSES: CONTAMINATION, MISHANDLING/ABUSE, PIECE-PART FAILURE

EFFECTS/RATIONALE:

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APPENDIX F

NASA FMEA TO IOA WORKSHEET CROSS REFERENCE/RECOMMENDATIONS

This section provides a cross reference between the NASA FMEA and corresponding IOA analysis worksheet(s) included in Appendix E. The Appendix F identifies: NASA FMEA Number, IOA Assessment Number, NASA criticality and redundancy screen data, and IOA recommendations.

Appendix F Legend

Code Definition

1 IOA recommends deleting the IOA failure mode.

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APPENDIX F

NASA FMEA TO IOA WORKSHEET CROSS REFERENCE / RECOMMENDATIONS

IDENTIFIERS ::				NASA						: IDA RECOMMENDATIONS \$										
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	CRWEDP-3301	11	- 1	,				; ;		1	1			!						X
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07-1-725102-1	CRWEOP-6504	11	3/18		p	P	11	1	į			i.	ļ X		
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07-1-725102-2	CRWEDP-6505	11			P	ρ	11	1	1			1	ļ X		
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1.9.1 CRWEQP-5162 3/3 /	: 1DENT:	IFIERS	 	N	 ASA	 11		10A RECOM	MENDATIONS \$	
1.9.1 CRMEDP-5102 1 3/3 /	FMEA NUMBER	ASSESSMENT NUMBER	1 1	H#/F	A B C	1 1	HW/F	! A 9 C	(GEE LEGEND CODE)	1
1.9.3 CRMEDP-5109K 1 3/2 1 / 1	1 1.9.1	,	- ; ; ·			11	/	!	; ====================================	: :
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2.1.2 CRMEOP-5103 3.73 7 2 2.1.3 CRMEOP-5103 1 3.75 7 7 2 2.1.3 CRMEOP-5112 1 3.75 7 7 2 2 2 2 2 2 2 2	1 1.9.3	CRNEOP-15190X	\Box	3/2R	! !	1 1	1	£	† i	
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2.12.3 CRWEOP-15210X 3/2R			11			11	, , , , , , , , , , , , , , , , , , ,		•	
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